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Fuels Used in Open-Hearth Practice

The 1920 Ingot and Castings Production
Analyzed—Producer Gas Chiefly Employed for Ingots and Oil for Castings

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EARLY in the history of the open-hearth steel industry, producer gas was practically the only fuel, but to-day six different mediums are in use. Natural gas was available almost from the beginning in the Pittsburgh district. Fuel oil in more recent years has had widespread use and still later have been the developments in the employment of coke oven gas, tar and powdered coal. To ascertain the extent to which each of the fuels figures in open-hearth steel operations, THE IRON AGE sent a questionnaire to the producers of open-hearth steel ingots and steel castings in the United States, using the 1920 production as a basis. The scope of the investigation is shown in the questions reproduced on this page and the results are discussed below. These are taken up in two sections: Fuels used in producing open-hearth ingots and fuels used in making open-hearth steel castings. Replies were received from 83 companies producing open-hearth ingots and from 71 open-hearth steel foundries. In some cases single returns represented several companies, as in the case of the Steel Corporation.

Practice of Producers of Steel Ingots

IN the canvass of the steel ingot output of the country for 1920 less than six of the open-hearth producers failed to send replies. The data collected represent 94.41 per cent of the 1920 total ingot output or 29,931,485 gross tons out of 31,685,495 tons, the figures published by the American Iron and Steel Institute. A table on another page shows the relative production of steel ingots by the respective fuels and the percentages.

Coke Oven Gas and Tar

While producer gas is credited with the leading rôle, having been used to produce 55.14 per cent of the total ingot output last year, thus maintaining its old supremacy, there has been in recent years a development of vital importance. It is the burning of coke oven gas and tar, preferably in combination. The use of these by-products as open-hearth fuels has grown extensively in favor, but it is confined to the large steel producing companies which have their own by-product coke plants.

The general practice of these companies is to burn the coke oven gas with the tar in certain proportions, usually in the ratio of their relative production from the ovens, but there are several cases where the coke oven gas or the tar are used separately. Where the two are used together the tar furnishes the luminosity, whether the proportion of the latter be large or small. The results of this practice have been most satisfactory, and it is likely to increase wherever circumstances warrant.

These four questions brought out the information which is summarized in this article:

1. *What was your open-hearth steel output (ingots or castings) in 1920?*
2. *What proportion of this was made with:*
 - (a) Coke-oven gas and tar
 - (b) Fuel oil
 - (c) Producer gas
 - (d) Powdered coal
 - (e) Natural gas
3. *How much was basic and how much acid open-hearth?*
4. *Brief comments on the merits of fuels used.*

case of the larger companies. In the steel casting industry, however, it is much more extensively used in the latter than in the former.

In the majority of cases, fuel oil has either been the original installation, due to the necessity of having a low sulphur fuel or because of the high cost of coal, or it has been substituted for producer gas for various operating and metallurgical reasons.

From the data collected, coke oven gas and tar in combination ranked next to producer gas in the ingot steel output last year, being credited with 13.72 per cent of the total. While coke oven gas alone represents only 5.84 per cent and tar only 4.85 per cent of the total, the two fuels in their general use represent 24.41 per cent. The growing importance of these fuels is emphasized when it is recalled that ten years ago they were a very small factor and were more a waste product than a useful one, so far, at least, as direct steel production was concerned.

Of the companies reporting, 5 used in 1920 coke oven gas and tar, 2 used coke oven gas alone and 12 used tar only.

Fuel Oil

Next in importance to producer gas and coke oven gas and tar is fuel oil. Our investigation shows that of the total reported, 13.62 per cent or 4,075,351 tons of ingots were made in 1920 with oil as a fuel. It has been used much longer than coke oven gas or tar, but the latter is fast outstripping it in the

Natural gas has been and is an ideal fuel but its gradual diminution has caused several companies to turn to one of the other heat-producing agents. In 1920 natural gas was used in the production of 1,824,447 tons of ingots or 6.09 per cent of the total reported, ranking fourth on the list of the various fuels.

Powdered Coal

There have been several attempts to use powdered coal in open-hearth furnaces, not all of which have been successful. So far as our data throw light on this subject only 0.74 per cent of the total quantity of ingots reported upon was made with powdered coal.

Comments on the Fuels

The question asking for comments on the relative merits of the various fuels brought out a few interesting replies, some of which are abstracted as follows:

Coke Oven Gas and Tar Most Efficient

The vice-president and general superintendent of a large company in the Middle West states that he is "absolutely sold on the proposition that coke oven gas with tar is the best and most efficient fuel for the production of steel that there is, and that fuel oil ranks next. We do not have the blast furnace so cannot use the former fuel, but find that oil is the fuel for making quality steels, particularly alloy steel."

Another large Eastern steel producer states that his use of tar as an open-hearth fuel has been confined almost entirely to two small tilting acid furnaces for making steel castings, although the company has at various times used tar on one of its 75-ton basic furnaces in its main open-hearth plant. The general manager of the company also states that one of the main advantages in the use of tar lies in the ability to produce lower sulphur steel than is possible with the average supply of producer gas coal which has been available during the last several years. Tar burns with a much sharper flame than producer gas and care must be exercised when this is used on a basic furnace in order to prevent melting down the silica brick in the upper portion of the walls and roof resulting in more frequent trouble with the basic bottom. This bottom trouble does not occur, of course, where tar is used on acid furnaces.

A large producer of tin plate and sheets states through its vice-president and general manager that fuel oil and natural gas are used with practically the same satisfactory results but that coke oven tar is not entirely acceptable from a metallurgical standpoint. Powdered coal is as yet apparently in its experimental stage.

Fuel Oil Preferred

The general manager of a large sheet steel company in the Middle West asserts that fuel oil is better adapted to that company's conditions for melting purposes but that it is in a position to use only fuel oil and producer gas for melting purposes. Of the two, local conditions have demonstrated that the company can use fuel oil to much better advantage and with more economical results, taking into consideration all the different phases of production.

A large maker of tubes in the East states through its fuel engineer that it has found fuel oil very satisfactory, using heavy Mexican high sulphur oil after

the heat has been melted down and low sulphur distillate at the beginning. "In our particular case this proves a cheaper fuel. Producer gas has worked out with equal satisfaction as far as fuel properties are concerned."

A large steel and wire company in the Middle West testifies that the cost of fuel per ton, using fuel oil, has been lower than that of producer gas. The cause of this is the fact that the same furnaces (basic) produce approximately 8 per cent more steel per hour on fuel oil than producer gas.

A large producer of basic open-hearth ingots for sheets and tubes states through its vice-president that he experiences a slight increase in the tonnage per ton when liquid fuel is used, whether fuel oil, tar or pitch. There is also obtained a lower sulphur content in the steel when pitch or tar is used. He also states that the company experiences a slight increase in repairs and rebuilding costs on furnaces using liquid fuel. The majority of the ingot output of this company has been made with producer gas.

A large producer of basic ingots for forging steel, tin plate, black plate, etc., in the East, on the authority of its president, says that he would very much prefer to use fuel oil rather than producer gas were it not for the prohibitive cost of the former. "The quality of the steel is better and the output of the furnace is larger with fuel oil and there is no doubt but that the life of the furnace is longer with this fuel."

The company produced last year 90 per cent of its ingots with producer gas.

A company operating in Missouri, producing acid steel ingots, states that fuel oil is cheap in that territory and affords a nice, clean heat and is best adapted to small plants. Another small company in Massachusetts asserts that coal is cheaper but that fuel oil is easier to handle, while a

large producer of basic open-hearth ingots, using fuel oil exclusively, asserts that this fuel is very satisfactory but that the company expects to use coke oven gas and tar in the near future.

Merits of Natural Gas

The assistant to the vice-president of a large company, producing basic open-hearth ingots in the Middle West using producer gas, fuel oil and natural gas, states that natural gas as a fuel for steel making produces the best grade of steel specially from a sulphur standpoint; that natural gas and fuel oil are very much cleaner as a fuel, furnace repairs being much less than on other fuels and also that it means a much simpler furnace construction. "Due to scarcity it is practically impossible to obtain natural gas at this time for steel making. Fuel oil is very high in cost at any time, it being the consensus of opinion that it is more or less a gamble when purchasing it. In the use of fuel oil there is much less danger of tapping cold steel than there is with other fuel. In producer gas we find the cheapest fuel, but it does not produce a steel as low in sulphur as does either natural gas or fuel oil."

A large steel company in Pennsylvania which produces basic steel ingots with producer gas and natural gas, states through its president that "our preference is for natural gas but, owing to the scarcity and high price of this fuel, we are obliged to use producer gas, which is naturally cheaper than any other fuel for

Table of Steel Ingots and Castings Production of the United States in 1920 According to Fuel Used

Fuels	Ingots		Castings	
	Gross Tons	Per Cent	Gross Tons	Per Cent
Coke oven gas and tar	4,107,387	13.72	381	0.04
Coke oven gas.....	1,751,027	5.84		
Tar	1,454,333	4.85	6,000	0.62
Fuel oil	4,075,351	13.62	634,862	67.10
Producer gas	16,492,384	55.14	164,178	17.36
Natural gas	1,824,447	6.09	131,182	13.85
Powdered coal	226,556	0.74	9,779	1.03
Totals	29,931,485	100.00	946,382	100.00
Total output in 1920	31,685,495		986,400	
Percentage covered by replies	94.41		95.98	

us, since it is made from coal from our own mine."

A small company in Pennsylvania which made both acid and basic ingots, the former with fuel oil and the latter with producer gas, says that natural gas was used as the auxiliary fuel both for the acid and basic furnaces. Its experience in the basic practice has shown that producer gas is the most economical fuel. In its acid practice more production can be had by the use of fuel oil, but natural gas has the advantage of less oxidation in melting and lower cost per ton production.

Another company whose output is about equally divided between producer gas and natural gas as a fuel states that natural gas is faster but harder on the furnace.

Powdered Coal Most Economical

Discussing powdered coal, the president of a large company which produces acid and basic open-hearth ingots and which used last year producer gas and fuel oil, states that he has had no experience with the use of coke oven gas and tar, but says powdered coal is the most economical as far as fuel is concerned, shortening the time of heats mate-

rially, but the coal has to be very low in sulphur and very low in ash. "Furnace repairs have been excessively high and the difficulty with the ash was so great that we are forced to abandon the use of that process. If means can be found to handle the ash successfully and

economically, powdered coal would be an ideal fuel. In our experience oil has been the most satisfactory fuel, but its cost is so great as to make it impossible in producing steel for the competitive market. We have now arranged to discontinue the use of fuel oil. The most practical and most economical fuel has been producer gas."

Another company in the South, which used last year both producer gas and powdered coal, the latter to the extent of about 35 per cent of its output, states that in general it prefers producer gas to powdered coal, and another company, which last year used coal tar,

fuel oil and producer gas, states that the first two fuels were used early in 1920 to supplement producer gas because of a fuel shortage at that time. "In using tar about 46 gal. per ton of steel were necessary. In using fuel oil about 61 gal. per ton of steel, while for producer gas 700 lb. of coal per ton of ingots."

Practice of Producers of Steel Castings

THE striking feature of the analysis of the replies covering the open-hearth steel foundry industry is the very extensive use of fuel oil. The data received were from companies which made about 96 per cent of the country's total open-hearth steel castings and included all the largest producers. The table on another page shows that fuel oil was the medium used in producing 67.10 per cent of the total reported upon, as against only 13.62 per cent in the case of open-hearth steel ingots. This is a striking showing.

Producer Gas Secondary to Fuel Oil

Producer gas was instrumental in making 17.36 per cent of the total, ranking second to fuel oil and contrasting with its leading position in the ingot industry. The predominance of fuel oil in the steel casting industry in 1920 is due largely to its rapid substitution for coal. During the war the quality of the latter deteriorated and it was difficult to get. There was also the consideration that sulphur, particularly in acid open-hearth practice, could be kept down more effectively with oil than with gas from coal. On the Pacific Coast fuel oil predominates as a fuel both for castings and ingots. Only seven of the 71 companies reporting used producer gas in 1920; some of these used fuel oil also.

Natural Gas and Powdered Coal

Next to fuel oil and producer gas, natural gas accounts for 13.85 per cent of the output of open-hearth castings. The large steel foundries around Pittsburgh account for a majority of this, but even this fuel is practically being supplanted by fuel oil or producer gas. Of the foundries reporting 14 used natural gas in 1920; of the 14, there were 9 using both natural gas and fuel oil.

Powdered coal as a fuel for steel castings in open-hearth furnaces was used by but one company which produced 1.03 per cent of the total output reported on. This contrasts with 0.74 per cent in the ingot output.

Tar Used by One Foundry

Coke oven gas and tar played but a small rôle last year in the steel casting output. This is natural because the use of these fuels depends almost entirely

Table of the Total Output of Steel Ingots and Castings in 1920 as Made with Different Fuels		
Ingots and Castings		
	Gross Tons	Per Cent
Coke oven gas and tar	4,107,768	13.59
Coke oven gas	1,751,027	5.60
Tar	1,460,333	4.69
Fuel oil	4,710,213	15.20
Producer gas	16,656,562	53.93
Natural gas	1,955,629	6.28
Powdered coal	236,335	0.71
Total	30,877,867	100.00
Total production of steel in 1920	32,671,895	
Percentage covered by the replies	94.50	

on the proximity of a large by-product coke oven plant. Castings made with coke oven gas were insignificant, amounting to nearly 381 tons or 0.04 per cent of the total. As to tar, 0.62 per cent of the total was made by the use of this as a fuel. For 10 years or more a basic open-hearth steel foundry has been using tar as a fuel with eminent success.

Relative Merits of the Fuels

Some interesting testimony relative to the various fuels was given as follows by various companies producing open-hearth steel castings:

The vice-president of a large acid open-hearth steel foundry in the East states that several years ago, when the price of fuel oil was approximately 2½c. per gal., the gas producers were discontinued and the furnaces changed over for the use of oil, since which time oil has been used exclusively. The company has had no experience with coke oven gas and tar or powdered coal, but it is the belief that the former combination presents a very desirable and economical fuel where these materials are available as by-products. "The use of fuel oil has several advantages over producer gas, but the relative merits of the two depend upon the relative economies, which in turn depend upon relative prices of coal and fuel oil."

Another large acid open-hearth steel foundry in the Middle West gives the following testimony:

The fuel oil which we use averages approximately 28 gravity and we have always found it very satisfactory. Our main supply comes from the Oklahoma fields. We have had comparatively little experience with any other fuel, but operated for a short period on producer gas, which we found very much less satisfactory than fuel oil.

The assistant to the general manager of a large acid open-hearth steel foundry in the East states that the use of fuel oil for melting makes possible a grade of steel which meets the specifications better than any other process of melting.

A small acid open-hearth plant in the East, operating a 5-ton furnace, states that in a plant of its size fuel oil is entirely satisfactory, as there is practically no outlay in producers or other equipment.

A steel foundry in the Middle West operating basic

open-hearth furnaces on a small scale reports that it uses fuel oil exclusively for melting and finds it not only satisfactory but the most economical fuel that can be procured in that locality (Ohio). Good service on the brick work in the furnace is one result, together with general satisfaction in most other respects.

Natural Gas Preferred

A small steel foundry in the Pittsburgh district operating acid open-hearth furnaces reports that fuel oil is a very satisfactory melting medium for its purposes, but that natural gas is more satisfactory when available because easier to handle than fuel oil and not so hard on the furnaces.

A small acid open-hearth steel casting plant in Pennsylvania, commenting on fuel oil, reports that the greatest difficulty encountered was the presence of moisture in the fuel oil in the cold weather. Another small plant in Wisconsin uses fuel oil from the Tulsa fields which has proven very satisfactory, and another acid plant in Pennsylvania characterizes fuel oil as much cleaner and as giving a longer run on the furnace. Still another plant in New York State, producing acid open-hearth castings, states that the advantages of fuel oil for melting are low sulphur content and convenience, while a plant in California, producing both acid steel castings and basic ingots by the open-hearth process, states that fuel oil is much more economical than any other fuel obtainable in that territory.

Natural Gas and Fuel Oil Compared

The president of one of the largest steel foundries in Pennsylvania making a general run of acid open-hearth steel castings comments as follows:

We find that natural gas is the most satisfactory fuel for us to use, but the supply is gradually failing and we are able to secure it in ample quantities only during the summer months and have to resort to fuel oil during a considerable part of the year. We find, however, that greater speed without sacrifice of quality can be obtained in melting with fuel oil than with natural gas. One disadvantage in fuel oil as compared with natural gas is the tendency of the bath to take up sulphur in proportion to the amount in fuel oil.

The president of another large foundry in the same district, comparing natural gas and fuel oil, gives the following testimony:

Natural gas is, in our opinion, the ideal fuel for melting steel when it can be obtained. We realize that its exhaustion is approaching and we are investigating thoroughly the relative merits and costs of substitutes. From present indications we will probably use fuel oil when necessary on our open-hearth furnaces and install powdered coal in the remainder of our plant.

A company operating basic open-hearth furnaces in California states that, if it had its choice between fuel oil and natural gas, it would prefer natural gas, although it is compelled to use fuel oil in that district.

Producer Gas Cheaper than Oil

A prominent Ohio company, which in 1920 made about 50 per cent of its output with fuel oil and the rest with producer gas, operating both basic and acid, the greater proportion being acid steel, comments as follows:

In our opinion, with coal at \$7.75 per ton and fuel oil at 11½c. per gal., we effected a saving of 54 per cent when we changed from fuel oil to producer gas. Of course, if the price of coal and fuel oil varied, it would alter the percentage of saving somewhat, but in no case is it possible to produce steel castings as cheaply with fuel oil as with producer gas.

A small basic open-hearth steel foundry in Wisconsin reports entire satisfaction with producer gas as a fuel.

The following interesting testimony by the president of a small acid open-hearth company in one of the Northern States is to the effect that "oil has been used exclusively as the preferred fuel, but powdered

coal will come into use soon, since the company has a malleable department operating alongside of its steel foundry."

Open-Hearth Output as a Whole

Analyzing the industry as a whole, another table shows that the replies represented 94.50 per cent of the country's total production of open-hearth steel ingots and castings combined. Producer gas predominates at 53.93 per cent, with fuel oil second at 15.20 per cent. Coke oven gas and tar, used together or separately, accounts for 23.83 per cent of the total. Powdered coal has not yet attained a prominent position at less than 0.75 per cent, while the use of natural gas is not a large proportion of the total at 6.28 per cent.

The predominance of producer gas in the open-hearth steel ingot as contrasted with the greater use of fuel oil in the open-hearth steel casting industry is explained partly by the fact that producer gas has long been the leading fuel for ingots where the operation of furnaces is generally without intermission from week end to week end. In the steel casting industry fuel oil accommodates itself to the more intermittent periods of operation which are a large factor. There are also other reasons for its use as already brought out by the opinions of some of the steel makers.

Comparing the two branches of the industry, this investigation shows that, of the two predominating fuels, 49 companies used fuel oil last year and 46 used producer gas, while 17 of these companies used both fuels, whereas in the open-hearth foundry industry 65 companies used fuel oil and only seven used producer gas, four of them using both. Total companies reporting, as stated before, were 83 ingot and 71 steel casting producers.

It is evident that location plays an important part in the selection of the fuel used, whether for ingots or castings, though individual preferences also have their effect. There is no doubt, however, but that the comparatively recent introduction of coke oven gas or tar or both in American open-hearth plants is a development of far reaching importance, primarily because of the reductions in costs which are a consequence. It involves the use of a by-product which takes the place of a purchased fuel and it also means one more elimination of waste. Large companies having their own coke oven plant possess therefore a marked advantage.

Carnegie Steel Co. Buys Land

The Carnegie Steel Co. was the successful bidder for 108 acres on Neville Island, in the Ohio River near Pittsburgh, at an auction sale by the Government in Pittsburgh, Dec. 16. This land was taken over by the Government during the war as a site for a huge ordnance plant which was to have been erected and operated by the United States Steel Corporation. Sudden termination of the war before construction had far progressed led to its abandonment. The property adjoins that on which is located a blast furnace built and owned by the American Steel & Wire Co., but which for some time has been operated by the Carnegie Steel Co. What the latter proposes to do with the land just purchased has not been definitely decided, but there are intimations that it contemplates ultimately to consolidate several rolling mill plants in the Pittsburgh city limit on the Neville Island site.

The Fuller & Johnson Mfg. Co., Madison, Wis., maker of farm gas engines and power tools, has increased its working schedule from three days to six days a week to accommodate an improved demand for its products. It is employing between 150 and 175 workmen and expects to make further additions to the force immediately after Jan. 1 to fill orders for spring delivery.

SILICA BRICK

Refractories Manufacturers' Association Issues New Charts

THE IRON AGE of July 7, last, published a chart giving production, shipments, stocks and unfilled orders of silica brick covering a period from Jan. 1, 1918, to May 31, 1921. These figures were compiled from reports from all manufacturers by the Refractories Manufacturers' Association. It developed that in the compilation of the figures some errors crept in, notably regarding production, which tended to invalidate the picture of the industry as set forth in the chart. The errors were the result of giving the gross production without regard to kiln losses and breakage and occurred at a time when a good many manufacturers were engaged in manufacturing by-product oven

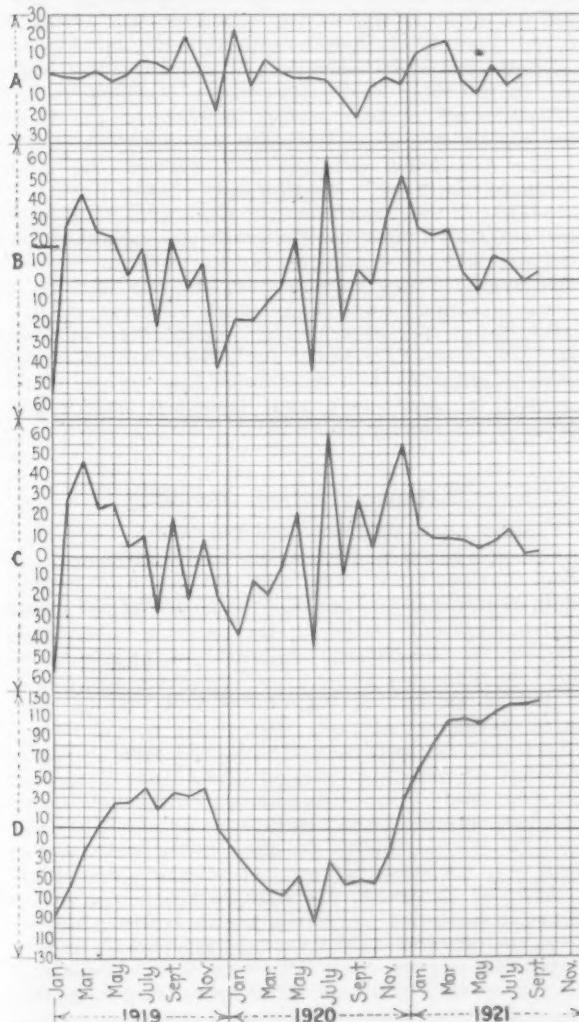


Chart "A" Shows the Divergence of Production and Shipments. Where production exceeds shipments, the degrees of divergence are shown above the zero line and vice versa. Chart "B" shows the divergence of production and new orders. Where production exceeds new orders, the degrees of divergence are shown above the zero line and vice versa. Chart "C" shows the divergence of shipments and new orders. Where shipments exceed new orders, the degrees of divergence are shown above the zero line and vice versa. Chart "D" shows the divergence of stock and unfilled orders. Where stock exceeds unfilled orders, the degrees of divergence are shown above the zero line and vice versa.

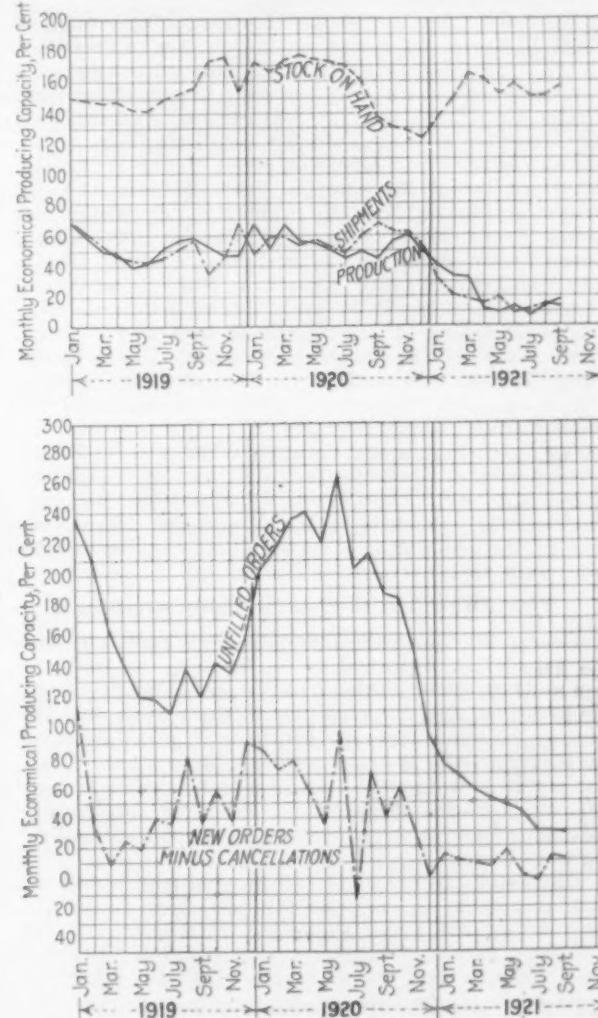
shapes, which are classified as specials, and the losses ran up as high as 33 1/3 per cent.

Production properly is the net number of good brick, and to the end that the chart should not be misleading the Refractories Manufacturers' Association has revised its figures and prepared a new chart, which is published herewith. This chart differs from the former one in that it embraces merely the reports of the members of the Refractories Manufacturers' Association. Since a large percentage of the silica brick capacity is embraced in the association, however, it provides a clear picture of the industry and moreover is brought down to Sept. 30, last. The association also

has prepared a chart running from Jan. 1, 1919, to Sept. 30, 1921, showing the degrees of divergence in production and shipments of silica brick, in production and new orders, shipments and new orders and stocks and unfilled orders. This chart also is based upon reports exclusively of members of the association.

More Steel Workers at Higher Wages

Iron and steel plants, according to figures of the Bureau of Labor Statistics, show for November a gain of 5152 employees over October in 119 establishments. This gain of 4.3 per cent is accompanied by a gain of



6.2 per cent in the amount of the payroll, and by an advance from \$41.89 to \$42.63, or 1.8 per cent, in the average pay envelope. Automobile building, on the other hand, has fallen off, there being a drop of 3546 men, or 3.5 per cent, and a drop of 8.5 per cent in the payroll. This means that the average pay envelope has shrunk 5.1 per cent. There has been a shrinkage, also, in the average envelopes of the men engaged in building and repairing railroad cars, amounting to 0.7 per cent; but the number of men at this work has increased 5.9 per cent. In the table, comparison will be found not only between October and November for these three branches of industry, but also between November of this year and November of 1920.

Period	Number of Establishments	Number of Men	Half-Month Payroll	Average Pay Envelope
<i>Iron and Steel</i>				
November, 1920.	118	185,547	\$14,720,283	\$79.33
November, 1921.	119	123,920	5,252,658	42.63
October, 1921....	119	118,768	4,974,236	41.89
<i>Automobiles</i>				
November, 1920.	53	114,027	3,295,077*	28.90
November, 1921.	52	96,838	2,702,234*	27.91
October, 1921....	52	100,384	2,953,210*	29.42
<i>Car Building and Repairing</i>				
November, 1920.	62	71,960	5,232,200	72.71
November, 1921.	63	53,964	3,251,901	60.26
October, 1921....	63	50,942	2,091,352	60.68

*Weekly.

PAST PRESIDENTS' NIGHT

New England Foundrymen's Association Has Unusual Program

The December meeting of the New England Foundrymen's Association, at the Exchange Club, Boston, Wednesday evening, Dec. 14, this year, took the form of a past presidents' night. Last year the association rounded out a quarter century's existence, and at that time plans were made to entertain in 1921 the past executives. More than 100 attended the dinner, at which C. S. Lovell, president, presided.

Thirteen past presidents attended. Following is a list of these, the companies which they represented at the time they served as presidents of the association, and the years they served: George H. Gibby, Condor Iron Foundry, 1895-1898; Henry A. Carpenter, A. Carpenter & Sons Foundry Co., 1902-1903; B. M. Shaw, Walker-Pratt Mfg. Co., 1904; Henry F. Arnold, American Tool & Machine Co., 1908; William A. Viall, Brown & Sharpe Mfg. Co., 1909; H. E. Wetherbee, James Hunter Machine Co., 1911; Charles L. Newcomb, Deane Steam Pump Co., 1912; Robert C. Bird, Broadway Iron Foundry, 1913; Charles L. Nutter, Old Colony Foundry Co., 1914; T. R. Scott, Brown & Sharpe Mfg. Co., 1917; George P. Aborn, Blake & Knowles Steam Pump Works, 1918; Robert L. Newcomb, Deane Steam Pump Works, 1919, and A. B. Root, Jr., Hunt-Spiller Mfg. Corp., 1920. Letters of regret were received from John Magee, Magee Furnace Co., 1905; Walter B. Snow, B. F. Sturtevant Co., 1906; William H. Bense, Kinsley Iron & Machine Co., 1907, and A. F. Corbin, Union Mfg. Co., 1915. Fred F. Stockwell, Barbour-Stockwell Co., Cambridge, Mass., who has been secretary of the association since its formation, sat at the table with the past presidents.

First Organized to Combat Labor Troubles

George H. Gibby, the first president, explained how the association happened to be formed. In 1895 the iron molders' union made demands on Boston foundries for \$2.50 per day, the abolition of piece work, and the limiting of apprentices to one to each eight molders. At that time the molders received \$2 to \$2.25 a day. Owners of nine foundries met by appointment to consider the demands of the union. After the trouble was adjusted these same nine foundry owners organized the association.

Charles L. Newcomb acted as spokesman for the past presidents in expressing their appreciation of the courtesy and honor shown by the association. He introduced each past executive, who addressed the members. He also paid tribute to Mr. Stockwell, whom he described as the backbone and mainstay of the association, while the members rose in a body. Dr. Richard Moldenke, a guest of the evening, who in the past has addressed the association members many times, was introduced "to the younger members present."

In a short business session held immediately after dinner, A. B. Root, Jr., Boston, A. F. Corbin, New Britain, Conn., and William A. Viall, Providence, R. I., were appointed a committee by the chair to make nominations for officers to be balloted on at the annual meeting in January. Arthur D. Little, Inc., Cambridge, Mass., engineer and chemist, was made a member of the association.

Richard H. Rice, works manager General Electric Co., Lynn, Mass., was the chief speaker of the evening. He spoke on the present-day need of establishing and maintaining mutual confidence between employees and management and on what the General Electric Co. has done to meet these conditions.

Mr. Rice first pointed out the progress made by industry in perfecting products the past 100 years or more, and the lack of progress in the relationship between management and employee during the same period. He stated that, if management had given the same thought and effort to the welfare of employees during that period as to development of products, industry would be better off to-day. He then and subsequently went on record as in favor of unions, bringing out the point that unions should exist in shops

and plants where management does not give proper consideration and fair play to the employee. He maintained workmen are fair when they have the same facts to reason on that management has, and he outlined the method adopted by the General Electric Co. in dealing with the men and their troubles. This method has sufficient flexibility to be applicable, in modified form, to factories having as few as 150 employees.

Mr. Rice does not advocate the General Electric Co.'s plan as something to beat the unions, but he does as something which gives the ambitious workman a chance.

Lead Too Pure for Cathedral Roofing

There is such a thing as too pure lead for roofing purposes. The ancient Gothic cathedrals of Europe were topped with this gray metal that blended well with the stone work and the style of architecture. Lead was specified for the roof of the Episcopal cathedral of Washington, which is now being built, but after it had been applied for some time, it was found that sheet lead on the steep roof slopes had a tendency to flow downward of its own weight and the heat of the sun.

The nail holes enlarged and allowed the metal to slip partially off. Metallurgists of the Bureau of Standards of the Department of Commerce were called upon and they found that the grade of commercial lead used was 99.9 per cent pure, far too pure for satisfactory roofing. They recommended the use of what is technically called hard lead, which contains approximately 6 per cent of antimony. Lead roofs on European cathedrals have lasted for 300 to 500 years, and the metallurgists are of the opinion that lead as manufactured in those days had impurities sufficient to harden it for roofing use.

Extensive School Building

Figures made public by the President's Conference on Unemployment show that an enormous amount of school construction is under way and that a large additional amount has been authorized as one of the means to give immediate relief to the nation's unemployed. According to the National Education Association, new school buildings are going up, or contracts about to be let, to the amount of \$20,553,250, will provide much needed seating capacity.

Commenting upon these figures, Col. Arthur Woods, chairman of the Committee on Civic and Emergency Measures, said: "Hundreds of new school buildings are needed in every State in the Union. Hundreds of thousands of school children in the leading cities are in school only half time for want of seating space. Other hundreds of thousands are seated in buildings whose light and sanitation are a menace to health. Millions are in buildings ill suited to the purpose and requirements of education as it is now conceived and organized. Many such buildings added to the larger building programs of the cities can be made to create a great tide of employment which must certainly mean better times for the nation and its people."

New Ore Distribution Map

The Lake Superior Iron Ore Association, Kirby Building, Cleveland, has issued a map showing the distribution of Lake Superior iron ores and Eastern and foreign ores during 1920 with the location of the consuming furnaces. A similar map was issued in 1918 but that covered only the Lake Superior ores.

A. L. DeLeeuw, New York, consulting engineer, spoke on "Notions in Machine Shops That Should Be Scrapped" before a joint meeting last week of the machine shop section Providence Engineering Society, and the Rhode Island section American Society of Mechanical Engineers, in Providence. The talk was based on experiences in the shops of the Singer Sewing Machine Co., the Cincinnati Milling Machine Co. and other manufacturing plants.

Adjustable Speed With Motor Driven Mills

Two Satisfactory Systems Described, with Comments on Their Relative Characteristics and the Particular Work for Which Each Is Most Adaptable—Discussion

BY K. A. PAULY*

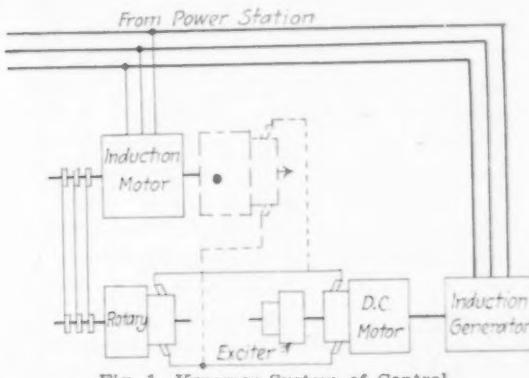
ECONOMIC considerations demand that steel be rolled at the maximum speed possible without adversely affecting the quality of the product. The speed at which the steel will enter the rolls is affected by the diameter of the rolls, the weight and cross-section of the piece, and the extent to which the rolls are ragged. For the same pair of rolls, the smaller the section and the lighter the piece, the higher the speed at which the rolls will grip it. Once the piece has entered, the maximum speed at which it can be rolled is determined by its section and by the draft. It is essential with large drafts, especially for cast ingots, that the speed be low, to allow time for the steel to flow. The speed is also affected by the type of mill,

be varied gradually over a considerable range, but when once adjusted, remain practically unaffected by the load.

Varying-speed motors are those in which the speed varies with the load, ordinarily decreasing when the load increases.

Multi-speed motors are those which can be operated at any one of several distinct speeds (these being practically independent of the load), but which cannot be operated at intermediate speeds.

Adjustable-speed motors should embody all the characteristics, strength, rigidity, reliability, safety and



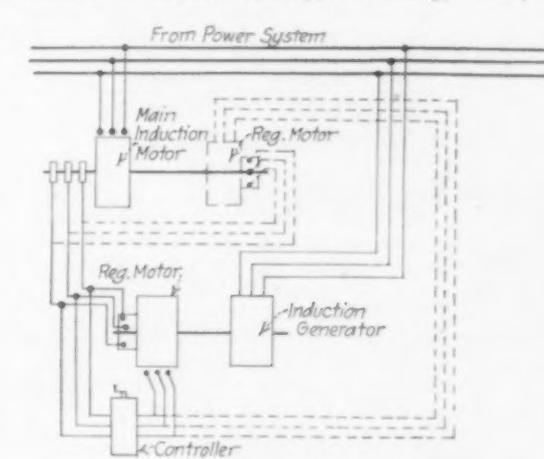
the method of handling the steel and the weight of the piece.

In rolling certain shapes, the amount of waste is greatly affected by the speed. If the speed is too high, the steel will not flow into the corners, and if it is too low it will flow out between the rolls, producing a "fin" which cannot be rolled in by subsequent passes. Increasing the speed for smaller sections not only increases the production, but decreases the power consumed per ton rolled, because of the higher average temperature maintained during rolling.

Obviously, the best speed is frequently a compromise between opposing factors, and differs with almost every section, making it advantageous, and often necessary, to provide adjustable-speed control for mills rolling a variety of shapes. While the installation of large mills, making a comparatively small range of sections, has tended to reduce the advantages of adjustable-speed operation, the ever increasing roll speeds have had the opposite effect, and we find a constantly increasing demand for equipments capable of being operated over a considerable range in speed. Not only this, but the speed requirements become more and more exacting as to refinement of control.

The difficulties encountered by the electrical engineer in obtaining an adjustable-speed motor are not always appreciated by the man familiar with the characteristics of the steam-engine. The latter is naturally a variable-speed machine, to which special control devices must be applied to give it constant or adjustable-speed characteristics, while electric motors of the type applicable to steel mill main rolls are essentially constant-speed machines. The following definitions are given by the Standards Committee of the American Institute of Electrical Engineers:

Adjustable-speed motors are those in which the speed can



accessibility of the constant-speed induction motor, which have been such large factors in the success which has attended the application of these motors to rolling mills. When adjusted for any speed throughout the range of control, the speed should be only slightly affected by wide variations in load. The motor should be capable of carrying high overloads, 125 to 150 per cent, throughout the full speed range.

Its efficiency should be highest over the range of speeds required for the greater part of the production. If any of the alternating-current types is used, the power-factor should be high. Its cost must not be excessive.

At the time when motors were first applied to main rolls there were available four methods of obtaining adjustable-speed control, all of which had been thoroughly tried out in other fields:

Adjustable-speed control with direct-current motor, in which the speed of either a shunt- or compound-wound machine, taking power from a constant potential source, is changed by varying the strength of its field.

Adjustable-speed operation by the so-called Ward-Leonard system of control, in which the speed of a shunt- or compound-wound, direct-current motor is varied by varying the voltage impressed on its armature, at the same time maintaining its field constant.

Multi-speed control with changeable pole motors, in which are used induction motors having two or more independent windings designed for different synchronous speeds, or with a single winding so arranged that the number of poles can be changed at will through switches external to the machine.

Multi-speed control with induction motors operating in concatenation. As applied to main rolls, concatenated motors consist of two mechanically connected single-speed or multi-speed induction motors, so connected electrically that the mill may be driven at the synchronous speed of either, or at a speed corresponding to the synchronous speed of a motor having a number of poles equal to the sum of the poles of both machines.

From the standpoint of speed control alone, the adjustable speed direct-current motors, with motor field or with Ward-Leonard control, meet steel mill requirements, but they are usually expensive and low in ef-

*Power and Mining Engineering Department, General Electric Co., Schenectady, N. Y. This is an abstract of the paper, which was read before the Engineers' Society of Western Pennsylvania.

ficiency, as they require a motor generator or synchronous converter to transform the alternating current of the general supply system to direct current. The loss in power due to the conversion varies from

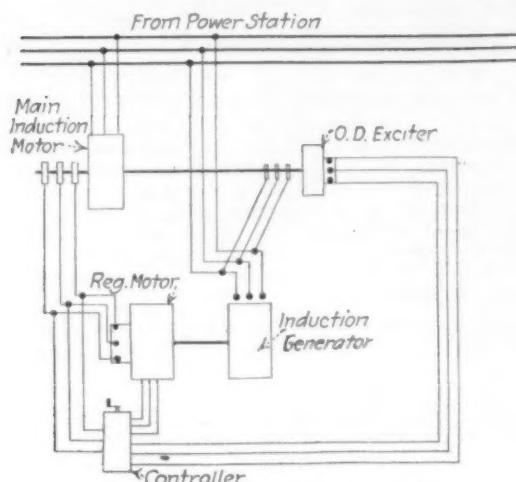


Fig. 3—Double Range Scherbius System

10 to 20 per cent, depending upon the size and type of converter and the nature of the rolling load cycle.

While direct-current motors can be, and have been, so designed as to operate entirely successfully when driving main rolls, the commutation problem is a difficult one, and the vibration and dirt which are always present aggravate the sparking at the high overloads, and make it difficult for the commutator to take on a polish. On the other hand, the use of the single-speed induction-motor under the most adverse conditions of load and dirt has demonstrated its superiority as a main roll drive.

It was not strange, therefore, that mill men a few years ago made every effort to adapt their mills to induction-motor speed characteristics. Where the range of sections was such as to require different speeds, two or three compromise speeds were chosen and multi-speed motors purchased. But, at best, these motors are inflexible; their use almost always entails a sacrifice and, especially with 25-cycle power, it is difficult to obtain speeds which are sufficiently near those desired.

Appreciation of these facts led many of the leading engineers, throughout Europe as well as in America, to devote considerable time and expense to studying the problem of making an alternating-current motor which would embody the mechanical characteristics of the induction-motor, the speed characteristics of the direct-current, adjustable-speed motor, and an efficiency which would approach that of the multi-speed induction-motor. Many systems were suggested and a few actually found their way into steel plants, although by far the greater number have passed into history with only a patent office record.

Of the systems developed, two embody to a greater or less degree the desirable characteristics of an adjustable-speed mill motor. These are commonly known as the Kraemer, or synchronous converter, system, and the Scherbius system. In both of these systems the slip energy of the induction-motor, which is ordinarily thrown away as heat in the rheostat, is returned either as electrical energy to the general power supply system, or converted to mechanical power through a motor mounted on the same shaft with the main induction-motor. These two systems are shown diagrammatically.

The Kraemer system requires one additional machine over the corresponding Scherbius equipment. The effect of this unit on the price and efficiency makes it imperative to adopt the drive with the smaller number of parts, and we find that, with a single exception, installations of this system are of the type having the regulating machine mounted on the main motor shaft. Developing direct-current motors mounted on the main roll shafts for conserving slip energy has materially reduced the costs of the expensive element of this system. Obviously, the capacity of the regulating equip-

ment in either system is determined by the amount of power transmitted through it; that is, by the capacity of the main roll motor and its range of control. However, in addition to this, its design is affected by the maximum rotor voltage and frequency.

The tendency of the synchronous converter to fall out of step, at low frequencies, makes the main roll motor with the Kraemer system unstable when carrying heavy overloads near synchronism. A rolling load, with its rapid fluctuations over wide ranges, aggravates this tendency toward instability. The addition of a flywheel, because it decreases the rates of change in the roll motor speeds and frequently reduces the slip, tends to stabilize the roll motors around synchronism.

An example will serve to illustrate this. The curve in Fig. 4 shows the effect of the weight of the flywheel on the time torque curves of a 1200-hp. motor driving a mill. This torque curve is typical of many of those to which adjustable-speed motors are subjected, and is less severe than one for a single-stand mill, in which the load is either all on or all off. The full line curve is that for the motor without flywheel having $WR^2 = (901,700 \text{ lb.-ft.})^2$; the dot dash curve corresponds

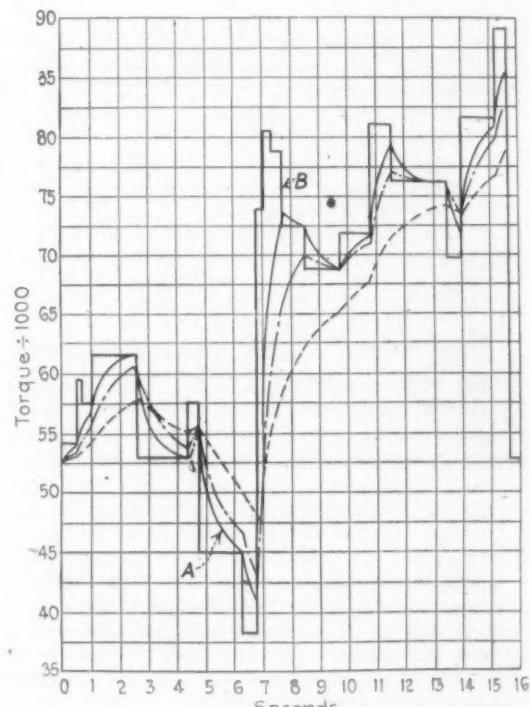


Fig. 4—Typical Rolling Mill Load Cycle

to a flywheel effect of $WR^2 = (1,726,500 \text{ lb.-ft.})^2$; the dotted curve corresponds to a flywheel effect of $WR^2 = (4,500,000 \text{ lb.-ft.})^2$. Referring to the full line curve, the slip at point A is 6.5 per cent, which corresponds to a rotor frequency of 1.65 cycles. The slip at point B is approximately 11.6 per cent, and the corresponding secondary frequency is 2.9 cycles.

A motor of this size, with a normal range of speed control, will require about a 300-kw., 25-cycle, synchronous converter, which will run 750 rpm. at rated frequency. At 1.65 cycles, it will run 49.5 rpm., and at 2.9 cycles, 87 rpm., or nearly double its former speed. The time available for making this change in speed is 0.9 sec. Obviously the change in speed of the synchronous converter increases with increased fluctuations in load, and will be a maximum for a single-stand mill, where the load varies from mill friction to rolling peaks.

If the synchronous converter is successfully to follow these rapid changes in speed, as the load and speed of the main motor fluctuate, its synchronizing torque must be sufficient to overcome the inertia of its armature. This torque is a function of the impedance of the rotor circuit of the main motor, including the armature of the synchronous converter and the line connecting them. At the normal frequencies at which synchronous converters are operated, 25 and 60 cycles

and even at the reduced frequencies met with in the Kraemer system, when the main roll motor is operating considerably above or below synchronism, the reactance component of the impedance of the converter circuit predominates, and the synchronizing torque, which is large, is very nearly constant for considerable changes in frequency and voltage.

But as the speed of the main motor approaches synchronism, and the rotor frequency and voltage are correspondingly reduced, we reach a point, depending upon the constants of the converter circuit, when the resistance becomes an important factor in reducing the syn-

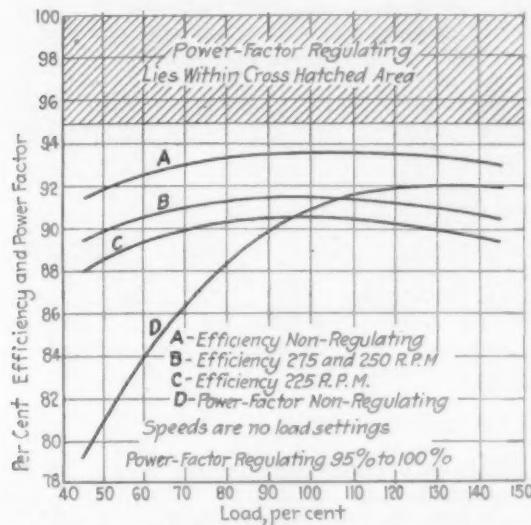


Fig. 5.—Typical Efficiency and Power-Factor Curves for Adjustable-Speed Induction Motor with Double Range Scherbius Control

chronizing torque of the converter. As the main motor approaches still further toward synchronism, we reach a critical speed beyond which the synchronizing torque of the converter is not sufficient to drag its armature in synchronism with the fluctuations caused by the load on the main motor, and the converter becomes unstable, falls out of step, and the main motor goes up to synchronism.

Obviously, the synchronizing torque required to keep the converter in step (and, therefore, the critical slip of the main motor) increases with the magnitude and rate of fluctuation in the load, and vice versa. As previously stated, the addition of a heavy flywheel to the main motor will reduce both the slip and the rate of change in the main motor speed, and, therefore, that of the controlling converter, and improve the stability of the main motor by reducing the critical slip or raising the critical speed.

In the Scherbius system the changes in the regulating set which follow changes in the main motor are purely electrical. The set runs at practically constant speed, independent of any changes in the speed of the main motor, and the main motor is entirely free from any instability at all loads up to its break-down point near synchronous speed, as well as at all other speeds. This system, however, has its limitations. As the frequency and voltage are increased, it becomes more and more difficult to design the commutator motor of the regulating set to commute properly under the severe rolling mill load. The practical commercial limit is reached at about 20 cycles, and as this is entirely too low to meet the requirements of mill motors, if the control is all below synchronism operating on 60-cycle circuits, engineers have devoted their attention to ways and means of reducing the frequency.

Obviously, if the roll motor can be controlled above as well as below synchronism, the rotor frequency for a given speed range will be greatly reduced, and approximately halved if the synchronous speed of the main motor is midway in the range of speed control. In addition, the capacity of the main motor will be lowered somewhat, and that of the regulating equipment reduced to approximately half that required with single range control, and the overall efficiency will be improved by the reduction in the losses.

That the Scherbius regulating equipment would function equally well above or below synchronism was realized from the beginning, but the problem of getting the main motor through synchronous speed remained unsolved, on a practical basis, until the advent of the well known double range Scherbius system, which has been so extensively used since the development of the first equipment, early in 1916, for the Bethlehem Steel Co. Saucon works.

At synchronous speed, the rotor current and voltage across the slip-rings of an induction motor are zero, and at this speed the roll motor can neither carry load nor provide excitation for the regulating set. If, however, we provide an auxiliary excitation for the regulating motor, which is automatically effective at and near synchronous speed, and which does not interfere with the proper functioning of the regulating set at roll motor speeds remote from synchronism, we can drive the main motor up to synchronous speed, where it will operate as a synchronous motor, and on through this speed to a point where the regulating set, without the assistance of the auxiliary exciter, will control the speed as it does below synchronism in the single range system. This is accomplished by means of the ohmic drop exciter driven from the main roll motor. When operating above synchronism, the action of the regulating set is reversed, power being transferred by it to the main motor. However, this reversal of the flow of power has no effect on the functioning of the system.

The number of poles, and therefore the synchronous speed of the ohmic drop exciter, are the same as for the main motor. As its slip-rings are connected to the general supply system, the frequency of the current drawn from the commutator follows exactly the law governing the frequency of the current from the rotor of the roll motor, and the voltage at the commutator is approximately constant. At synchronous speed, the ohmic drop exciter produces direct current. In appearance it resembles the armature of a synchronous converter.

The main roll drive does not differ from the standard induction-motor for this service, except for the addition of the ohmic drop exciter, which, as previously stated, provides excitation for the regulating motor when carrying the roll motor through synchronous speed.

The starting and regulation of a motor equipped with double range Scherbius control is very simple. Two controllers are needed, one for starting and one for speed control. With the speed controller set at the position corresponding to synchronous operation for the roll motor, and the starting controller in the off position, the regulating set is started through the induction generator by a compensator, in the ordinary way for induction-motor generators. With this up to speed, the main motor is started in the usual way, and when the starting resistance is all cut out, the armature of the regulating motor is connected to the slip-rings, and its field circuit closed automatically through an interlock on the last contactor of the starting control for the main roll motor. The speed of the rolls is then adjusted to any desired value by the regulating controller.

With this system it is possible to meet most exacting rolling speed requirements, without exceeding the limiting frequency for the regulating set, and to carry the maximum overloads at all speeds from minimum up through synchronism to maximum. In fact, without instruments in the rotor circuit, an observer can not tell when the motor passes the synchronous speed. A very interesting experiment frequently tried with this equipment to illustrate this feature is, with the motor running slightly loaded just above synchronism, to increase the load gradually and watch the rotor frequency approach zero and then the phase rotation of the rotor voltage reverse and the frequency increase as the machine passes below synchronism.

With the Kraemer system the main motor may be forced through synchronism at comparatively light load and then controlled above as below, but the gap in the speed range caused by the instability of the roll motor when loaded around synchronous speed, both above and below, and the difficulty of forcing it through syn-

chronism, make this system impracticable for double range operation. This gap is obviously much greater with 25 cycles than with 60 cycles.

In addition to reduced first cost and generally higher efficiency over the whole range of control, the double range Scherbius system provides a maximum efficiency about midway in the speed range, which is usually the zone in which the greater part of the mill output is rolled. The system is also quite flexible in this respect, and the synchronous speed may frequently be arranged at other points if production warrants it. If it is found desirable to increase the speed of a mill over that originally contemplated, this can readily be done, with almost no interruption in production, by substituting a larger regulating set in the double range system. For either the Kraemer system or the single range Scherbius system, this would usually require a much more expensive change in the main roll motor, which might delay the mill several weeks.

In Fig. 5, which shows a set of typical efficiency and power-factor curves for the double range Scherbius system, attention is called to the high efficiency from half load to approximately 50 per cent overload (curves A, B, and C); also to the increase in power-factor when running regulating at all speeds, as compared with the power-factor when running non-regulating at nominal full-load speed (curve D).

Choice of the system of control to meet any specific mill requirements can be made only after careful consideration of all conditions affecting the problem. However, the more general conditions having a bearing on the choice are, range of speed control, frequency of supply circuit, maximum load at all speeds, production of mill at different speeds, and whether or not the control is to be automatic.

The double range Scherbius system can readily be designed to meet all except the most extreme speed ranges, for both 25-cycle and 60-cycle supply circuits; while the Kraemer system is rather handicapped if the supply frequency is 25 cycles. When automatic control is required, the direct-current systems with motor generator will usually give better results. There are, however, a number of important advantages in favor of the double range Scherbius system which must be considered in making a choice:

Generally higher efficiency and correspondingly lower power consumption throughout the entire range of control.

Possibility of rolling a considerable part of the output of a mill by the motor without the regulating set, due to the motor speed falling intermediate between the upper and lower limits of the range. This is a very great advantage over any single range system. With single range control, if the regulating set fails, the high speed of the roll motor limits the production of the mill to small sections while the regulating equipment is being repaired.

Freedom from instability at any speed, and ability to carry its high overloads at all speeds throughout the range.

Cost usually lower than that for the other systems, when compared on the same basis; that is, range of speed control over which the maximum roll motor loads may be carried without the roll motor becoming unstable.

In common with the other systems, a large number of speed points may be provided, the power factor of the main motor may be raised, and the equipment is thoroughly reliable and readily maintained by the operating department.

The Kraemer system is essentially a constant-horsepower drive, but we must not permit this to influence us in analyzing the load conditions of a mill. The Scherbius system is usually at its best at constant torque, but it is not out of line when it is designed for constant horsepower, and many such equipments are now operating. Also, if conditions warrant, the commutator motor may be put on the main motor shaft and give the system constant-horsepower characteristics, and save one machine over the Kraemer system. It may be given constant-torque characteristics by substituting a motor generator for the direct-current motor on the main roll shaft. Giving either system constant-horsepower characteristics is simply a matter of converting the slip energy to mechanical power, and delivering it to the roll shaft, constant horsepower not being peculiar to either system.

Experience from tests, and discussions with mill men, indicate that normal mill requirements are

neither constant torque nor constant horsepower, but lie between these limits. Comparisons which we have made within the limits of the Scherbius system have shown it to be as high in efficiency as the Kraemer system, or even higher, and lower in first cost.

Discussion

BY G. E. STOLTZ*

One point, which is very important from a power and speed standpoint, is the flow of metal which takes place when rolling deformed or irregularly shaped sections. Fig. 6 shows a typical section of this kind—a deformed tie-plate. The arrow shows the normal direction of rolling, but it could also be rolled in the other direction, at right angles to the arrow.

This tie-plate would probably be rolled from an 8 x 8-in. bloom. It would be rolled down in eight or

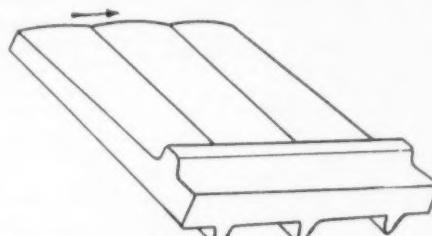


Fig. 6—Typical Section of Deformed Tie-Plate

ten passes to a rectangular section, with a thickness approximately equal to that of the ultimate section over the lugs, the final form being given it entirely in the last pass. This means that, in the last pass, certain parts of the bar are given very large reductions, and other parts are reduced very little. This condition requires a considerable flow of metal in some of its sections if the structure of the section is to be kept uniform, and the operation is in reality one of die forming. A low speed is required to get this effect.

With an ordinary adjustable-speed drive the speed is set for a certain rolling schedule, and remains there until a change in schedule requires a different speed. However, on some mills it is an advantage to be able to change the speed rapidly, while the steel is in the rolls. This enables the operator to drop the speed down so the piece will enter readily, and then increase the speed and get the steel through the roll quickly. This method of rolling increases the tonnage output of the mill, and also enables the steel to be finished at a higher temperature.

A drive of the Ward-Leonard or Ilgner type is required for this service, and the equipment is the same as for reversing-mill drive. A separately excited direct-current motor drives the mill, and is supplied with power from a separately excited direct-current generator. The generator is driven by a wound motor induction-motor. Speed adjustment up to a certain value is obtained by varying the field of the generator and beyond this value by varying the field of the motor. Fig. 7 shows values of voltage, current and speed on an equipment of this type driving a 28-in., three-high, structural mill. It will be noted that most of the rolling on this schedule was done by varying the motor field, the voltage applied to the armature being at nearly maximum value at all times.

On some installations, adjustable-speed or two-speed driver are put in—not so much to obtain the advantages of speed adjustment on different schedules, as with the idea of being able to speed up the mill after it has been in use for a while, and more skill is developed in handling the steel. Some two-speed motors were operated on the low-speed winding for the first few months, and were then speeded up, and have been operating on the high-speed winding practically ever since.

Rotary-converter adjustable-speed sets are built either for constant torque or constant horsepower throughout the speed range, depending on which characteristic appears to fit the mill conditions. However,

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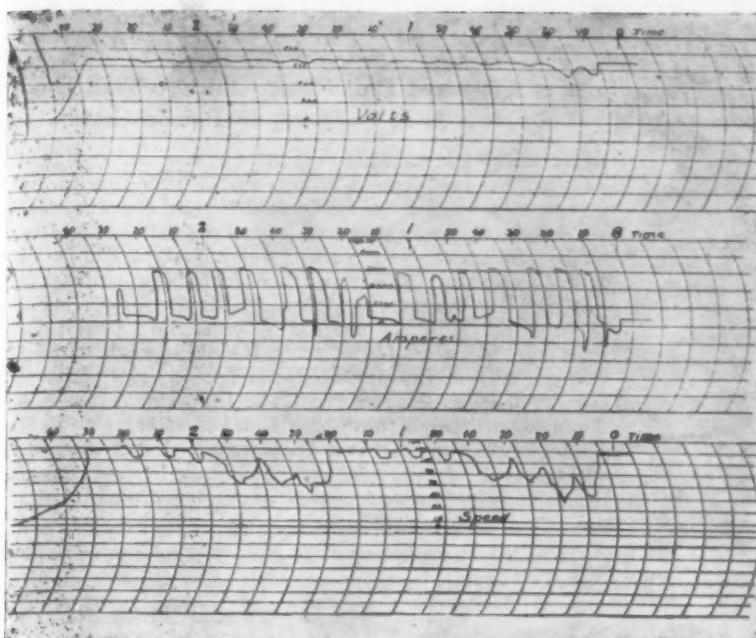


Fig. 7—Voltage, Current and Speed Curves on 28-In. 3-High Structural Mill Driven by Ward-Leonard Equipment

we have found that in most cases constant horsepower is required—that is, higher torques at the lower speeds—and in fact on several installations considerably higher horsepowers are required at low speed than at high speed.

Curves which illustrate this condition were taken on a 10-in. continuous skelp mill at the Mark plant of the Steel & Tube Co. of America.* The first seven stands are driven by a 2000-hp., 2200-volt, three-phase, 60-cycle, constant horsepower, rotary converter, adjustable speed set, with speed adjustment from 350 to 234 r.p.m. The three finishing stands are driven by a similar 2000-hp. set, with speed adjustment from 234 to 160 r.p.m. Fig. 8

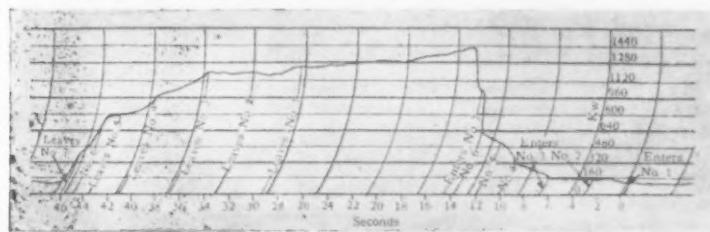


Fig. 8—Load on Roughing Mill Rolling Skelp

shows the load on the roughing mill and Fig. 9 the load on the finishing mill, when rolling the widest skelp— $7\frac{1}{2}$ in. Figs. 10 and 11 show the load on the roughing and finishing mills, respectively, when rolling $2\frac{1}{2}$ -in. skelp.

It has been found that the roughing mill can be run at high speed on all schedules. The finishing mill, however, when the above curves were taken, was operating at 163 r.p.m. on the wide skelp, and at 221 r.p.m. on the narrow skelp. It will be seen from the charts that the roughing mill carried average peaks of approximately 1250 kw. when rolling wide material and 650 kw. when rolling narrow material.

*Electric Journal, September, 1920, pages 367-371.

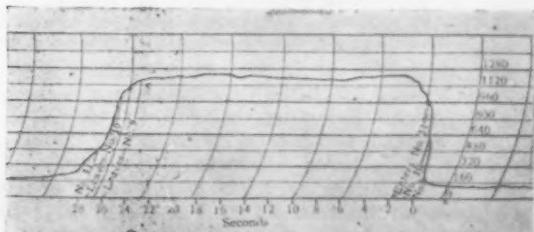


Fig. 9—Load on Finishing Mill Rolling Skelp

The finishing mill required 1175 kw. when rolling wide material at low speed and 750 kw. when rolling narrow material at high speed.

On most merchant mills rolling a variety of sizes, the per cent reduction taken per pass is approximately the same, regardless of the size of the billet started in the mill. This means that when rolling from a 4 x 4-in. billet, approximately four times as much material is displaced per pass as when rolling from a 2 x 2-in. billet, with a corresponding increase in torque. The facts that the speed in the first case is lower, and that the smaller piece cools more rapidly, offset this difference to some extent, so that the horsepower required to roll the larger billet at low speed would probably be only slightly greater than that required to roll the smaller size at the high speed.

The rotary-converter system can be built to run above synchronism, as well as below, and, in fact, steel has been rolled under this condition. However, we believe that simplicity and reliability are two of the chief considerations in the design of rolling-mill equipment, and have been unwilling to complicate un-

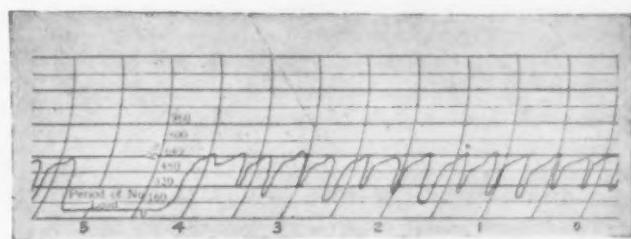


Fig. 10—Load on Roughing Mill Rolling Skelp

necessarily an inherently simple system of control.

The reliability of this system is shown by delay reports on some of these sets. On two 1500-hp., constant-horsepower sets installed at the Duquesne works of the Carnegie Steel Co., more than three years ago, there has been one delay chargeable to the speed-adjusting equipment. This was caused by a short-circuit in the roughing mill rotary converter. The Atlas Crucible Steel Co. installed a 700-hp. constant-horsepower, rotary-converter system 3½ years ago, and has not experienced a single

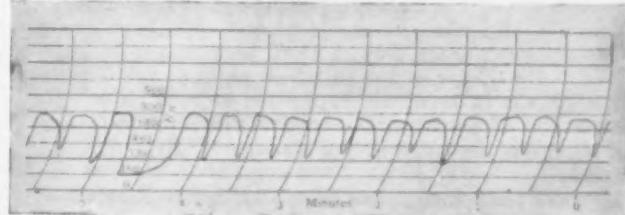


Fig. 11—Load on Finishing Mill Rolling Skelp

delay due to the electrical equipment. A year later, the same company installed a similar set of 450 hp. capacity, upon which it has had one delay, due to a poor connection on one of the commutator risers of the rotary converter.

One rotary-converter, adjustable-speed set, driving a mill with no flywheel, is subjected to loads of 300 per cent at every pass when rolling certain schedules, and there are no signs of instability, even at this load. Over 40 per cent of these sets are driving mills without flywheels. Whether a flywheel should be used or not depends entirely upon the nature of the load and the capacity of the power station, and not at all upon the

type of electric drive.

When a flywheel is not used, the speed regulation of the set is made as flat as possible. When a flywheel is installed on the mill, additional slip is provided for in order to allow the mill to slow down under heavy loads, and give up part of its energy. This effect is obtained on a rotary-converter set by proper design of the direct-current motor field, which gives the set a drooping speed characteristic, with no loss of power in resistance. Continuous running slip resistance is supplied, to be inserted in the secondary circuit when the main motor is operating alone at the high speed.

BY F. M. VAN DEVENTER*

We recently made an analysis comparing some present steam-engine-driven mills with what we considered an ideal installation, embodying a motor-driven mill supplied with power from a modern central power generating station equipped with high efficiency boilers and efficient turbo-generators. It was indicated that we could obtain a brake hphr. at the motor coupling for about 13,000 B.t.u. in the steam, or about 16,000 B.t.u. in the coal.

When we came to the efficiency of the mill motor, we had no definite test data, and it was necessary to estimate. The figure used was 85 per cent, which is intended to represent the efficiency of conversion from the mill coupling back to the high-tension line. The losses indicated by this figure are supposed to include transmission losses, those occurring in the speed regulation equipment, and motor losses. They are supposed also to cover the average operating condition for regular service, including idling periods, as well as conditions of full loads.

*Engineer National Tube Co., Pittsburgh.

Edison Medal Awarded to C. C. Chesney

The Edison medal, "for meritorious service in electrical science or electrical engineering or electrical art," has been awarded for 1921 to Cummings C. Chesney, chief engineer and general manager of the Pittsfield Works of the General Electric Co. This award was made by a committee of 24 members of the American Institute of Electrical Engineers for his work in the development of transmission apparatus, generators, condensers, transformers and converters during his association with the late William Stanley of the Stanley Electric Mfg. Co., Pittsfield, Mass., which was amalgamated some years ago with the General Electric Co.

Mr. Chesney was born at Selinsgrove, Pa., Oct. 28, 1863, and received his bachelor of science degree from Pennsylvania State College. After teaching mathematics and chemistry he became associated with Mr. Stanley in 1888. The next two years he was with the U. S. Electric Lighting Co., Newark, N. J., and then became one of the incorporators of the Stanley Electric Mfg. Co. He was vice-president and chief engineer of that company from 1904 to 1906, becoming chief engineer and manager of the Pittsfield plant of the General Electric Co. in 1906, which position he now holds. He is a fellow of the American Institute of Electrical Engineers and a member of the Society of Arts, London, England.

The Edison medal has been awarded to the following: 1909, Elihu Thomson; 1910, Frank J. Sprague; 1911, George Westinghouse; 1912, William Stanley; 1913, Charles F. Brush; 1914, Alexander G. Bell; 1915, no award; 1916, Nikola Tesla; 1917, John J. Carty; 1918, Benjamin G. Lamme; 1919, W. L. R. Emmet; 1920, Michael I. Pupin; 1921, C. C. Chesney.

A commercial and industrial fair is to be held in conjunction with the Manila Carnival Feb. 4 to 12, 1922. The Carnival Association, through George L. Logan, manager of the Philippine district office of the United States Bureau of Foreign and Domestic Commerce at Manila, has extended an invitation to American companies to attend and participate in this fair. Space will be available for exhibits of American products.

EXPORT FREIGHTS COMPARED

Under Proposed Rail Rates, Chicago Will Have Advantage in Shipping to Pacific Coast

A reduction of 21c. per 100-lb. on iron and steel shipped by rail from Chicago and Pittsburgh to the Pacific coast has been authorized by the Chicago, Milwaukee & St. Paul Railroad, says Caldwell & Co., Inc., 50 Broad Street, New York, foreign freight contractor and forwarder. The new rate for these shipments, destined for Japanese, Chinese, Philippine or other Far Eastern ports, is 50c. per 100 lb. from the Chicago district and 59c. per 100 lb. from the Pittsburgh district. An analysis of the proposed and present rail rates on iron and steel shipped from the Chicago, Pittsburgh, Youngstown and Birmingham districts to the Far East, via Atlantic and Gulf and Pacific ports, has been made by Caldwell & Co. These rates are figured on an ocean freight basis of \$8 per gross ton from Atlantic and Gulf ports and \$5 per net ton on shipments from Pacific coast ports. Rates are given in cents per 100 lb.

Via	From Chicago.	From Pittsburgh.	From Youngstown.	From Birmingham.
	Ill.	Pa.	Ohio	Ala.
New York—				
Rail.....	47.5	28.5	31.5	48.5
Ocean.....	35.5	35.5	35.5	35.5
Through..	83	64	67	84
Philadelphia—				
Rail.....	46.5	26.5	29.5	45.5
Ocean.....	35.5	35.5	35.5	35.5
Through..	81	62	65	81
Baltimore—				
Rail.....	44.5	25.5	28.5	43.5
Ocean.....	35.5	35.5	35.5	35.5
Through..	80	61	64	79
New Orleans—				
Rail.....	46.5	51.5	40	21.5
Ocean.....	35.5	35.5	35.5	35.5
Through..	82	87	75.5	57
Mobile—				
Rail.....	46.5	51.5	40	19
Ocean.....	35.5	35.5	35.5	35.5
Through..	82	87	75.5	54.5
Pacific Coast (Present)—				
Rail.....	71	80	80	71
Ocean.....	25	25	25	25
Through..	96	105	105	96
Pacific Coast (Proposed)—				
Rail.....	50	59	59	50
Ocean.....	25	25	25	25
Through..	75	84	84	75

Large Decrease of Inventories of Canadian Car & Foundry Co.

The annual statement of the Canadian Car & Foundry Co., Montreal, Que., shows combined profits for the year of \$1,188,853, as compared with \$1,515,712 a year ago. Provision for depreciation amounted to \$365,800 as against \$516,800, leaving profits before charging interest of \$823,053, compared with \$998,912 in the previous year. These left net profits for the fiscal year of \$107,603, compared with \$539,397. The profits, added to the total surplus carried forward, made the total amount available for distribution \$6,351,207. Surplus to be carried forward into the new year amounted to \$3,251,207. The company's current assets are set at \$8,360,807, as against \$20,720,183 a year ago, and this reduction is almost entirely due to a large decrease in inventories which are set at \$4,646,501, as against \$14,788,960. The company's reserves are shown at a total of \$5,377,246, as against \$5,032,922 a year ago.

The American Palestine Co., 874 Broadway, New York, has decided to open a permanent exhibit of American manufactured products in Palestine. The company is capitalized at \$5,000,000, holding charters of two financial institutions of Palestine, the Urban Mortgage Co. and the Industrial Credit Co. S. C. Lampert is president of the American Palestine Co.

Reinvestment a Present Need in Industry

The Disastrous Attempt to Substitute the Government for the Individual Investor—The Remedy Has Proved Itself Worse Than the Disease

BY STERLING H. BUNNELL*

If there is any one point on which all, whether employers or workmen, are in agreement, it is that present business conditions are far from satisfactory. Factories have few orders, men are out of work, needed homes are not being built, farmers cannot make a fair profit, and wages in some industries are going down faster than the cost of living, while in other lines wages stick disproportionately at the very top.

It was to prevent just such a general and disastrous business situation that attempts were made in this and other countries, by the taxation of large incomes, to check the accumulation of capital in the hands of the few. None of the men responsible for the imposition of graduated income and excess profit taxes seem to have realized that the effect would be to check the accumulation of capital, without greatly hindering the few who wastefully use great wealth. No one seems to have thought of the desirability of the reinvestment of capital obtained from profits, and the effect of the new tax laws to check the orderly increase of industries necessary to meet the wants of a growing population.

Reinvestment of Highest Importance

The fact is that the manner and amount of reinvestment of capital has always been the greatest economic question of the world. The rate of wages concerns only to-day; but unless some men save part of their production and invest it in repairs, new buildings, equipment, and the reclamation of land, the coming generation will suffer from unemployment and scarcity. Within each industry there are two classes of people only: those who spend all their personal receipts for their immediate wants, and those who set aside a portion of their receipts for investment. The real questions for debate are, how much profit shall an industry make for reinvestment and for what ends shall the reinvestment be made.

Only blind, haphazard attempts have been made hitherto to hit upon answers to these old questions, and these attempts were by men manifestly without the slightest knowledge of the principles behind the superficial conditions they thought they were going to affect. Entire systems of government are determined by the attitude toward the citizens' savings. The pure communist theory would permit no individual to save and reinvest. The State, therefore, must own all means of production, provide a fair living for each citizen, and maintain all who may be unable to work. This system, though many times tried, never had more than a limited success in small groups held together by some strong idealism, such as religious faith. Applied to a great nation it has just scored the most stupendous and deplorable failure in all history.

In contrast to the obstinate bigotry of communism, socialist theories are of all degrees, but may fairly be said to center on state ownership of industries of national scope, and control of all others so that no individual may be able to obtain an income in excess of his immediate personal necessities. State support necessarily must be provided for all unable to work, since none may save for the future. A large part of the socialistic scheme is actually in effect to-day as a result

of the war, in all countries which were engaged, including the United States. The result of the experience has been the pronounced weakening of the socialist parties in all countries, and the conversion of increasing numbers of citizens to the determined support of even reactionary governments, because in that way only is there assurance of the right of every one to "life, liberty and the pursuit of happiness," without hindrance from tax-supported bureaus of officials.

Reinvestment Discouraged

The operation of the half-way socialistic tax measures is easy to analyze. Citizens with large incomes, if not deprived of their surplus by heavy taxation, will (as always in the past) invest their excess in productive industries. That is, they normally use their money to pay workmen to build factories and machinery by which other workmen may produce goods for the general supply; and reclaim and develop land on which other men may live and produce food for the increasing population. This procedure has been severely checked by taxation which may take half of an income obtained from the risks and uncertainties of manufacturing or agriculture. It is now profitable for the best brains in industry to avoid business cares and enjoy a fixed income from investments in city buildings or State roads, which, to reduce taxes for the community, were made non-taxable so as to be attractive even at only four or five per cent interest. The manufacturer who by hard work and good judgment makes a large profit may be allowed as little as half of his income to reinvest. But if he sells his factories at a sacrifice, probably to men less able in management, and lends his funds to city or state governments, he can spend the rest of his life in the pursuit of pleasure, with an absolutely certain net income of 4 or 5 per cent.

Right Investment of Savings and Profits

Beyond a doubt it would be to the advantage of the nation if the national savings should be made by the many rather than by the few. But the savings must be made, if we are to have homes, farms and workshops for the children who are growing up. It is conceivable, though wholly impracticable, that the factory owner might pay the workmen partly in cash, partly in securities representing invested savings. It is wholly practicable for the workman to save and invest part of his earnings for himself. Very possibly, better wages could be granted if the workmen would accept a portion in shares representing profit which has been expended in plant improvement. A little education in the matter of profit and its profitable use for investment could hardly fail to be of advantage to management and workers alike.

The fundamental question is not who shall get the profit, but how shall the profit be invested. It is, of course, undesirable that some man holding nine-tenths of the stock of a great works shall expend nine-tenths of the earnings in villas, private parks, game preserves and yachts which he rarely visits or uses. It is highly desirable, however, that some one shall reinvest that profit in factories and farms to furnish the means of living in future for the workmen's children who are growing up. If the workmen themselves would spend any surplus on the movies and other delights, refus-

*Consulting engineer, Bunnell, Macy & Henrques, New York.

ing to restrict present pleasures to provide for future needs, better let the boss get the profit as at present, because in nine cases out of ten he does spend his surplus for the land, building and equipment that some one must furnish.

The attempt to confiscate large incomes by heavy taxation has only resulted in pouring money into the hands of governments for the support of hordes of officials, clerks and other non-producers. The flood of tax money has already been checked by the diversion of reinvestment funds from productive industry to non-

productive government loans, putting a complete stop to the development of industries. Regardless of bad tax laws, the millions of common people (who do not pay the higher surtaxes) have it in their own power to continue development, by saving and investing for themselves. If such a process could be set in motion, the general education in economics that would result would do more for the common good than all the altruistic schemes that ever pretended to make it possible for the shiftless man to live free on the surplus of the thrifty.

HEATING WITH FUEL OIL

Machine Designed for Factory and Domestic Use—May be Used to Generate Steam for Power

With a simple, practical and durable machine for burning it, ordinary fuel oil is the cleanest, most convenient and most satisfactory form of fuel for heating. The market price of fuel oil has remained around 5c. per gal. But even at 10c. per gal., heating with fuel oil will be found a much more desirable proposition, and no more costly, than the old method of heating with coal.

For instance, one of the smaller sized Hardinge Brothers (Ravenswood, Chicago) oil burning machines (capable of heating the average ten room residence) can be turned down so low that its fire will consume $\frac{1}{2}$ gal. of fuel oil per hour. On a mild winter's day, when the fire is turned low, it would require only about 12 gal. of oil for 24 hr. heating. At 4c. per gal. this would be less than 50c. for fuel.

On the other hand, when a large, hot fire is needed it can be had quickly, and as simply as turning on the electric light. It takes only two or three minutes to light the fire when the boiler is equipped with this machine, and the fire is hot as soon as it is lighted. Therefore, it can be completely extinguished without any of the previous dread of rebuilding it.

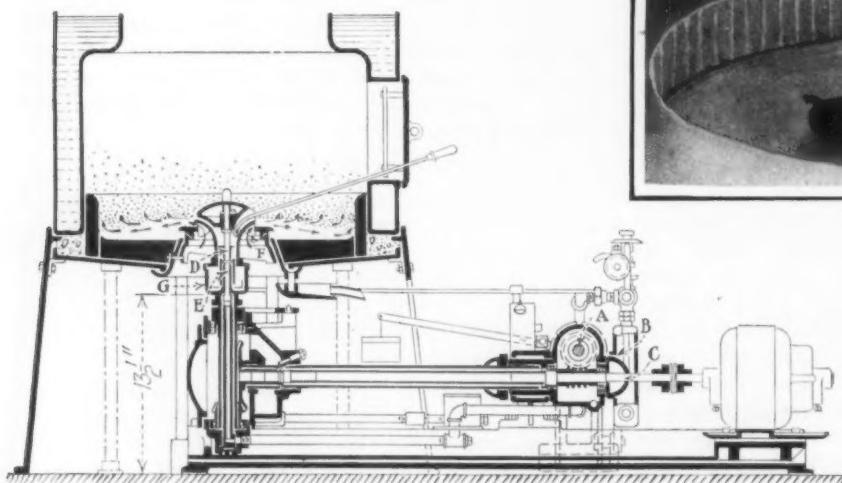
How the machine does its work can be best shown by following the course of the oil from the time it enters the machine until it is burned.

Oil is drawn from the supply tank, under the floor, up through the strainer and through the pump at "A." It is then forced into the pressure chamber at "B," and is kept under pressure by the pump.

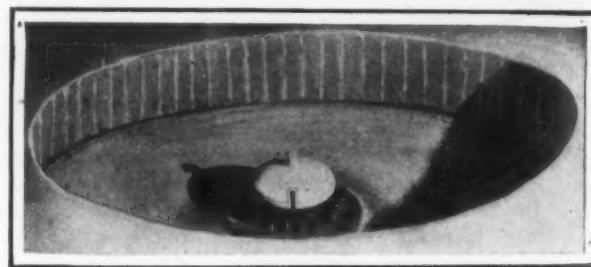
Oil now passes upward through the revolving needle valve seat, which regulates the quantity of oil to be burned, and follows up to the standpipe openings "C." From this point it flows downward to the bottom of the revolving cup of the atomizer, where centrifugal force throws it through the tube of oil, which is held in the diameter "D" by centrifugal force. The oil thus reaches the bottom of the cup, where it is constantly emulsified by the agitator.

While traveling upward through the cup the oil has time to separate from the dirt, water and other substances, and all find their logical positions according to their specific gravities. The space behind the tube of oil receives the débris constantly extracted from the oil by this treatment. The oil, which is the lightest, comes up to the smallest diameter and passes out over the atomizer into the fire box. The dirt, water and other substances, all of which are heavier than oil, constantly pass off under the oil and are consumed.

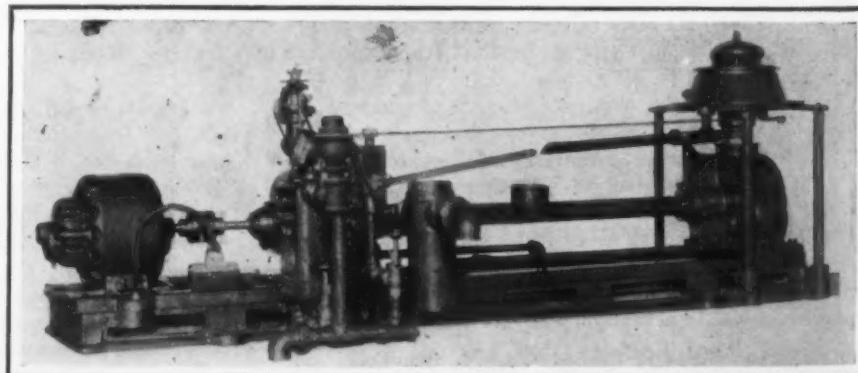
This constant treatment of the oil to be burned eliminates possibility of dirt accumulating anywhere in the

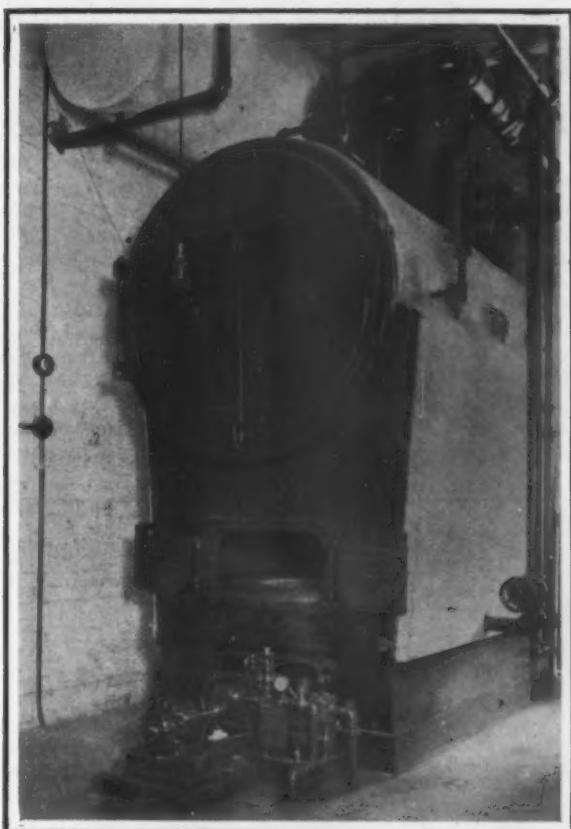


In the Section Is Shown How the Oil, Entering the System at A, Travels to D and Thence into the Combustion Zone at the Bottom of the Heater. Where It Is Mixed Intimately with Air Entering at F. The illustration at lower right corner of page is of the complete outfit, without the hearth plates, ready for installation under a boiler. The dome-shaped portion at extreme right is the atomizer and air-control ring, which replaces the boiler grates.



Combustion Chamber, Atomizer and Air-Control Ring, Shown Above, Take the Place of Ordinary Boiler Grates. This apparatus is the portion which appears in upper right corner of the lower view.





Installation of Oil Burning Equipment with 6-In. Burner Under a 5400-Ft. Pacific Boiler. This equipment is the size used for a four-story factory building measuring 40 x 165 ft.

machine up to this point. The only place where dirt can collect is on the convex curve of the atomizer bell, and this is cleaned by the simple process of drawing the small steel poker over the bell's surface while the machine is in motion. Intervals for cleaning the atomizer bell may vary according to the kind and amount of oil to be burned.

For instance, a small sized burner in a home ordinarily need not be cleaned oftener than once in two weeks; a commercial heating machine might need cleaning once a week; and in the case of tractors or locomotives, where hundreds of gallons of fuel oil are burned daily, the atomizer bell may need cleaning twice daily during constant operation.

Cleaning the atomizer bell is such a simple task that it can be performed daily, or whenever the fire is adjusted, and can be done in less than a minute, while the fire is burning. A clean atomizer bell means perfect atomization.

As the oil leaves the bell shaped atomizer, it is thrown by centrifugal force into the fire box and formed into millions of globules. The whirling air vanes "E-E" force a volume of air out under and up through the oil.

This machine can be applied to any boiler by removing the old fire grates to make proper room for the oil burning atomizer or burner head. To arrange any heating system for burning ordinary fuel oil means merely to place fuel oil tanks, inside or outside underground, and place a machine in the present boiler. There are proper sized burners all applicable to and interchangeable with these machines, made to heat all sizes of homes and other buildings, as well as to generate steam for motive power.

Permanent low cost of operation is one of the great claims for this machine. It will burn all fuel oils from the heaviest and cheapest up to kerosene. It is capable of successfully burning oils of all gravities; heavy, low gravity, Mexican fuel oils. The previous objection to using heavy oils has been overcome through the simple expedient of so treating them that they will flow freely over the atomizer. A simple process of water jacketing the oil supply pipe, to maintain the free flow of the heaviest oil to and from the supply tank, even in the

coldest weather, will easily overcome the only objection to using such oils.

Extra strength has everywhere been considered, and all superfluous parts eliminated. Bearing and wearing parts are designed for 100 to 500 per cent greater capacity than will ever be required of them during operation. Sturdy construction guarantees reliable, dependable service.

Cast Iron Railroad Car Wheels

New specifications for cast iron wheels are reported from the office of engineer of tests, Delaware, Lackawanna & Western Railroad. Four sizes are represented, weighing 650, 700, 750 and 850 lb. It is specified that the chill at middle of tread shall be not less than $\frac{1}{4}$ in. nor more than 1 in. (1 $\frac{1}{16}$ in. in the two larger sizes). At the throat, the chill for the two larger sizes shall be not less than $\frac{1}{2}$ in. nor more than $\frac{15}{16}$ in.; for the two smaller sizes, not more than $\frac{3}{8}$ in. and not less than $\frac{5}{16}$ in., and $\frac{7}{16}$ in. for the 650-lb. and 700-lb. wheels. The depth of pure white iron shall not vary in any wheel more than $\frac{1}{4}$ in. around the tread on the rail line. The blending of white and gray iron shall be without any distinct line of demarcation.

Chemically, the total carbon shall be not under 3 nor over 3.65 per cent, with combined carbon not exceeding 0.85 per cent. Manganese shall be not under 0.50 nor over 0.85 per cent; silicon, not under 0.45 nor over 0.75 per cent; phosphorus, not over 0.32 per cent; sulphur, not over 0.16 per cent. These analyses are to be made from drillings taken from the center of the back plate, midway between the core holes.

Cost of Living Slowly Falling

Monthly figures of the Bureau of Labor Statistics show the wholesale price of all commodities during November to be 49 per cent above the average for 1913, compared with 50 per cent in October. There was a drop of 2 per cent in metals and metal products, of 5 per cent in farm products and 4 "points" in cloths and clothing. Building materials are up 5 points to 197 and fuels are up 4 points.

Our table shows the figures for the two most recent months, for November, 1920, and the peak of 1920. It shows also the amount of liquidation, between the peak price and the present, of the excess of the peak price over the average of 1913. Metals have been liquidated 80 per cent, only one group (farm products) showing a higher degree of liquidation.

Index Numbers of Wholesale Prices, by Groups of Commodities

(1913 equals 100)

	Peak	1920 Novem-ber	1921 Octo-ber	Novem-ber	Liqui- dation, Per Cent
Farm products	246	165	119	114	90.4
Food, etc.	287	195	142	142	77.5
Cloths and clothing....	356	234	190	186	66.4
Fuel and lighting.....	284	258	182	186	53.3
Metals and metal prod- ucts	195	170	121	119	80.8
Building materials.....	341	274	192	197	59.8
Chemicals and drugs... .	222	207	162	162	49.2
House-furnishing goods. .	371	369	218	218	56.5
Miscellaneous	247	220	145	145	69.4
All commodities.....	272	207	150	149	71.5

Largest Electric Steel Melting Furnace

The Ford Motor Co. has placed an order for the largest electric steel melting furnace ever designed. Its capacity will be 9000 kva., which is claimed to be three times the size of any previously installed furnace. It will have six electrodes and will be of the Greaves-Etchells bottom conducting type, sold by the Electric Furnace Construction Co., Philadelphia. This furnace will be the principal melting unit of the new battery of electric furnaces for the Ford company's River Rouge works.

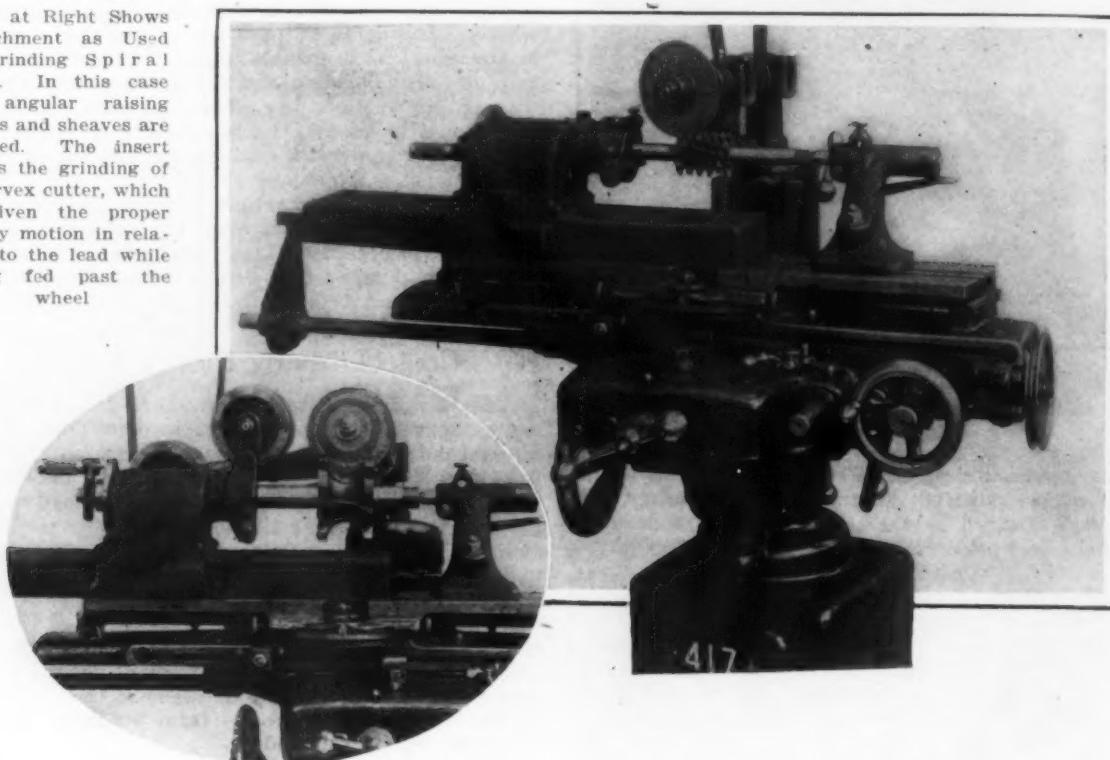
All 30 of the hot tin mills at the Farrell, Pa., works of the American Sheet & Tin Plate Co. now are in operation, six mills which hitherto had been idle having been started at midnight, Dec. 18.

Cutter and Hob Grinding Attachment

An attachment developed primarily for grinding spiral hobs and the Curvex cutters of the Pratt & Whitney Co., Hartford, but which can also be used on any work requiring regrinding on the face of the teeth, has been brought out by the R. K. Le Blond Machine Tool Co., Cincinnati. It is designed for application to the Le Blond universal tool room grinder, as shown in the illustration, although it can, by making the necessary adapting parts, be used on other similar machines.

The cutter to be ground is mounted on an arbor between the centers of the attachment, the machine table is set to zero, and from the chart of leads and angles provided, the taper guide bar of the attachment is set to the required angle. As the table of the grinder is fed horizontally the cutter spindle is automatically revolved in the proper relation to lead and spiral angle, which is stamped on each cutter by the manufacturer. The cutter is indexed, successively bringing each tooth to

View at Right Shows Attachment as Used in Grinding Spiral Hobs. In this case the angular raising blocks and sheaves are omitted. The insert shows the grinding of a Curvex cutter, which is given the proper rotary motion in relation to the lead while being fed past the wheel



the grinding plane by means of a plunger and index plate.

The wheel head is mounted on an angular raising block, giving the wheel spindle an angle of 15 deg. from the horizontal center line. A special wheel is used, the front face of which is dressed vertically. This provides a single line of contact between the wheel and work and enables the work to be fed vertically on to the wheel to the depth of the tooth, eliminating drawing of the temper by attempting to grind the entire tooth depth at one traverse of the table. The knee is swiveled on the stump to an angle corresponding to the helix angle of the cutter and the table reciprocated past the wheel by the regular rack and pinion movement, while the work is being rotated in proper relation to lead and spiral angle. The attachment is designed so that the grinding plane is always on a true radial line of the cutter, and the wheel always clears itself in the work.

For grinding spiral hobs the angular raising block and belt sheaves are not required, the attachment being furnished simply as a hob grinder, omitting those parts, as shown in the illustration. The hob is mounted on an arbor between centers. The knee is swiveled to the spiral angle of the flute of the hob, the swivel guide bar is set to the proper angle corresponding to the lead of the spiral and the hob is given the proper rotation while being reciprocated past the grinding wheel. The hob is indexed for grinding each successive flute by the index plate and plunger at the rear of the spindle,

after the principle of the dividing head. Any spiral cutters, within the range of the machine and the attachment, requiring grinding on the radial faces can be ground in the same manner.

Refractories Manufacturers' Association

Members of the Refractories Manufacturers' Association listened to several interesting papers at the quarterly meeting of the association at the William Penn Hotel, Pittsburgh, Dec. 6 and Dec. 7. "The Effect of Furnace Draft on Heat Penetration," was the subject of a paper by Raymond M. Howe, senior fellow of the association at the Mellon Institute of Industrial Research, Pittsburgh, who contrasted the effects of forced and natural furnace drafts. "Fuel Conservation," which was the subject of S. M. Kier, president Kier Fire Brick Co., Pittsburgh, was a report based upon recent investigation into the types of kilns and fireboxes and the question of the tonnage of

coal consumed per 1000 brick. The data were compiled to furnish the association with a base upon which to start elimination of waste and ultimately for the standardization of practice.

The activities of the association in connection with freight rates and its co-operation with the Federal Trade Commission in the developing of foreign markets for refractories and the furnishing of the commission with production statistics by the association also were discussed. Other speakers and subjects were Ernest F. DuBrul, general manager, Machine Tool Builders' Association, Cincinnati, "The Effect of Good and Bad Combinations of Production and Orders;" Heiskell B. Whaling, consulting economist and statistician, Cincinnati, "Fundamental Economics Underlying Price Changes in the Refractories Industry;" A. F. Greaves-Walker, production engineer, American Refractories Co., Pittsburgh, "A Preliminary Study of the Railroad Tunnel Kiln;" E. R. Weidlein, M. A., director, Mellon Institute of Industrial Research, "Extending the Work of Research in Refractories," and E. W. McCullough, manager, Fabricated Production Department, Chamber of Commerce, U. S. A., "Co-operation With the Chamber of Commerce of U. S. A. on Matters Affecting Depreciation."

The next general meeting of the association will be held at the William Penn Hotel, Pittsburgh, Jan. 25, and the annual meeting and election of officers will be held in Chicago, March 15 to 17 inclusive.

Navy's Plans for Scrapping Battleships

Representative Meeting at Philadelphia Does
Not Indicate the Forming of a Salvag-
ing Industry—Much Uncertainty Exists

BY L. W. MOFFETT

PHILADELPHIA, Dec. 20.—No specific plan for the establishing of a ship salvaging industry in the United States developed at the meeting held for that purpose last Friday at the Philadelphia navy yard. Attended by about 100 people, it soon was made evident that the majority of them came as observers with the possibility that they might become interested either in a scrapping industry, or by purchasing some of the vessels to be sold by the Navy Department without attempting to engage in dismantling work as a continuous operation.

While the meeting was not fruitful of definite results, it is looked upon as having accomplished some desirable purposes. It was informative in that it provided those present with the plans of the Navy Department in more detail than previously announced. Briefly, these show that the department is open to negotiations with prospective buyers on lenient terms as to payment, and that the method of selling by bids is only tentative. It was indicated that private negotiations might be preferable. This was the view also of some possible buyers who apparently were not willing to disclose any detailed plans they had in mind. Joseph G. Hitner of Henry Hitner's Sons Co., Philadelphia, however, said his company is equipped to scrap naval vessels, has done such work and was ready to handle vessels offered by the department. It is hoped by the Navy Department that the meeting will prove the entering wedge to future and specific plans by which it can dispose of all of its ships now offered for sale and others to be placed on the market, which, it has been urged, would provide a substantial foundation for a permanent salvaging industry.

Meeting of Preliminary Character

The meeting is looked upon as being essentially of a preliminary character, and one that did not yield definite results, for several reasons. Among them are (1) lack of knowledge, with certain exceptions, of salvaging on a big scale, (2) absence of any explanation of practical operation of such an industry, based on experience in foreign countries, particularly England, (3) uncertainty of the financial success of such an operation, which would involve large capital, (4) uncertainty as to the practicability of establishing beaching space or using dry docks, (5) no assurance as to what tonnage might be available except that coming from the Navy, because of the lack of a program as to the establishment of an American merchant marine, and (6) the depressed condition of the steel trade and its low absorption of scrap.

The meeting, however, was representative. It included representatives of the Carnegie Steel Co., the Bethlehem Steel Co., the Lukens Steel Co. and the Jones & Laughlin Steel Co., financial interests, ship-builders, scrap dealers, acetylene torch interests, salvaging interests and machine tool representatives, as well as representatives from various Government departments. The steel representatives, while not desiring to be quoted, said they had come as spectators at the invitation of the Navy Department and indicated that they probably would not take up negotiations either to engage in a scrapping industry or to purchase a number of ships for purposes of salvaging. Some shipbuilding representatives said they might offer to buy vessels largely for the purpose of employing labor that would be engaged in dismantling them. Many of those present inspected some of the ships which are offered for sale on Jan. 16. These and their tonnage displacements for normal load, include the battleships Maine, 12,500; Missouri, 12,500; Wisconsin, 11,550; the cruiser Memphis, 14,500; ex-monitor Puritan, 6060; monitor Ozark, 3225; ex-monitor Miantonomoh, 3990

tons, and monitor Tonopah, 3225. Of this list the battleships and the monitor Tonopah are at the Philadelphia yard.

Admiral Nulton's Statement

Presiding at the meeting was Rear Admiral Louis M. Nulton, commandant at the Philadelphia yard. The principal address was made by Capt. J. J. Cheatham of the Bureau of Survey, Appraisal and Sale, who said it was hoped by the Navy Department to engage interest in the organization of a scrapping program.

"While there is only a small percentage of the ships here for sale that you will see to-day and which we are discussing," he said, "due to the decisions of the Conference on Limitation of Armament, there doubtless will be several hundred thousand tons of additional ships to be disposed of. There are now battleships on the West Coast soon to be disposed of."

"The magnitude of the problem of ship salvage has begun to present possibilities of a permanent and profitable industry, and as there is no specialized industry at present in this country designed to do such work at a minimum cost, it is the hope of the department that some such organization could be effected to break up these vessels with the greatest profit to the Government as well as to yourselves."

"In the event of such a responsible organization being developed, the Navy Department would rather, I believe, do business with it by direct negotiation than by the present system of competitive bids. We hope the shipbuilders and the steel industry, those who have the experience and equipment to undertake such work, will interest themselves in the possible formation of such a salvage organization. The proposition is big from the standpoint of the cuts both in old ships and in new unfinished ships that will come later."

The conference was supplied with a table of weights, dealing with the steel, and various types of equipment, in the main to enable calculation as to the general weights by classes and the costs of breaking up the vessels. Captain Cheatham said the department was open to any suggestions as to means and terms of sales, pointing out that the idea of deferred payments would be considered.

Conditions to Be Imposed

Capt. W. P. Robert, construction officer of the yard, related in some detail the conditions under which the ships would be turned over to purchasers. Of chief importance in this connection was the announcement that the ships will be sold minus 22 flat side armor plates between frames 28 and 72, the bidder submitting alternate bids on each vessel. One bid would be for the amount to be paid for the vessel without the plates, the cost of removal to be borne by the purchaser and delivered f.o.b. cars at the point designated, and the other bid for the amount to be paid for the vessel minus the plates, the cost of removal to be borne by the department and the plates removed before delivery of the vessel is made. The guns are to be destroyed. It is understood that the Navy Department requires the return of the armor of the sizes indicated so that it may be either re-melted and made into new armor at the Charleston naval ordnance plant, or be used as a target to test projectiles at the Indian Head, Md., proving grounds.

One of the most interesting features of the discussions was contributed by Mr. Hitner, who assured Captain Cheatham that his organization engages in large salvaging operations and has handled ships, though no battleships, which never before have been offered for sale. Mr. Hitner said the company's plant

at Torresdale had broken up former naval vessels and that it was equipped to handle all the navy desired to dispose of. This was the most concrete offer made.

Mr. Hitner urged that, as a matter of protection to responsible bidders, the Navy Department should require a cash deposit or acceptable security of 10 per cent of the amount of the bid at the time it is submitted and payment of at least 15 per cent more within 30 days. Mr. Hitner said that the price will depend largely upon the cost of dismantling and breaking up, and stated that it would be helpful if the navy would specify the thickness of the armor and the weight of each ship. Captain Cheatham said this and any other data desired would be provided by the navy in circulars. He said, however, that the department will guarantee nothing as to weights and that it is proposed to sell the ships "as is." It is not believed the department will entertain the idea suggested by some after the meeting that it is better equipped to handle the entire program of dismantling and scrapping and should undertake the work. It is evident the department is anxious to turn the ships over to buyers in their present condition without devoting any attention to them. One scrap dealer said that the navy would be unable to get more than \$1 per ton of displacement for the vessels, though admittedly this was an estimate only and did not accord with the views of others, but none thought the department would get anything like what it has been hoping to obtain.

Will Be Great Tonnage

One naval officer said the tonnage to be sold will be larger than was expected.

"Due to the decision of the Conference on the Limitation of Armaments to allow Japan to keep her recently completed super-dreadnought Mutsu," he said, "and the completion of two of our latest super-dreadnoughts, Colorado and Washington, to maintain the

balance, the subsequent 'cut from underneath' in our active battle fleet will throw the total to be scrapped by this country into gigantic figures.

"The Colorado and Washington, added to the top of our fleet column, will add 65,200 tons that must be taken from the bottom. This will entail the probable cut of three of the four oldest ships now active, the Delaware and North Dakota, 1909, 20,000 tons and the Florida and Utah, 1910, 21,825 tons. For a gain of 16 16-in. guns we scrap 30 12-in. guns, which are now regarded as obsolete.

"If the ships of this class are scrapped in accordance with the disarmament agreements, their predecessors automatically will be abandoned as obsolete, aside from the fact that they still swell our capital ship total."

It was stated that between the Missouri, to be sold next month, and the Utah, which would be scrapped by the conference, there is an age difference of 10 years, represented by six successive classes of battleships.

"In these six classes," the naval officer said, "the United States now has out of commission 18 battleships with an aggregate tonnage of 289,000 that must be sent to the scrap heap. This is in addition to cruisers and auxiliaries totaling 200,000 tons. In the new construction that probably will be scrapped are six battle cruisers totaling 258,000 tons and six super-dreadnoughts of the same tonnage. Thus our total to be scrapped will approximate something over 1,000,000 tons, enough work to keep a salvage plant busy for some time."

There was expressed considerable doubt, however, that a salvage organization would have much success under present market conditions in disposing of such scrap as is available for steel works use. It was also observed by a steel man that dumping such a quantity of scrap would further depress the scrap market itself, with a questionable effect on the steel market, the former being the commodity bought and the latter the commodity sold by steel producers.

under the new rules, but employees called for special work on Sundays get three hours' pay for the first two hours when called for less than a day's work.

Rigid rules of the national agreement fixing the beginning and the end of the working day are replaced by provisions that starting time for all shifts may be arranged by mutual understanding of railroad officers and employees' committees based on service requirements. Similar elastic rules have been provided for determining the time for meals, and the national agreement requirement that overtime paid for meal times consumed in working is changed to provide that pro rata pay must be paid for such periods worked.

Judge Anderson Not Sustained

The recent decision of Federal Judge A. B. Anderson of Indianapolis forbidding the use of the check-off system of collecting union dues among coal miners was ordered revised in an opinion handed down by the United States Court of Appeals at Chicago, Dec. 15. It was held that the Indianapolis District Court had erred in enjoining the performance of the existing check-off contract in West Virginia coal fields. Rehearing of the case by Judge Anderson was ordered. In disapproving the action of the lower court, the Court of Appeals pointed out the following errors:

In not confining the injunction to the Borderland Coal Corporation which asked the injunction.

In not limiting the prohibition against attempts at unionizing at the mines.

In not limiting the prohibition against sending money to West Virginia for union purposes.

In enjoining the performance of the existing check-off contract in the central competitive field.

At the December meeting of the Cincinnati Chapter of the American Society For Steel Treating, held at the Ohio Mechanics Institute on Dec. 16, S. J. Felton, metallurgist of the Lunkheimer Co., Cincinnati, read a paper on "The Hardness of Steels and Cast Iron." The reading of the paper was followed by a very interesting discussion.

PAY FOR OVERTIME

United States Railroad Labor Board Makes Decision Affecting Half a Million Men

New rules, effective Dec. 16, for railway maintenance of way employees, were announced on Dec. 13 by the United States Railroad Labor Board at Chicago. The outstanding feature of the decision, which affects 585,000 men, is that it provides for the payment of time and a half for overtime after the tenth hour instead of the eighth hour of work, as provided in the old national agreement. Estimates of the saving effected for the railroads cannot be made because of varying conditions of weather and business, it is pointed out, but it is added that in normal times the roads have paid hundreds of thousands of dollars a month for this overtime.

While the change is considered an important one, the principle of paying overtime only after the tenth hour was recognized in the national agreement for a large class of maintenance of way employees, such as laborers employed in extra or floating gangs, whose employment is of a seasonal or temporary character. In the recent decision the board extends the principle to apply to regular track laborers.

The new rules define maintenance of way employees in such a manner that employees engaged in the maintenance of telephone, telegraph and signal equipment are not excluded from the classification as under the national agreement. It is now possible to bring them under the ten-hour overtime rule.

Hours, Instead of Working Forces, Reduced

The decision allows the railroads and their employees to make agreements for the reduction of the number of hours worked and paid for each day, in order to avoid reducing forces. Under the national agreement the roads were compelled to pay such employees as were retained a minimum of eight hours' wages, which necessitated lay-offs.

Time and one-half for Sunday work is eliminated

NEW FELLOWS GEAR SHAPER

Roughs and Finishes Automatically in One Setting With Same Cutter—Other Features

A new high-speed gear shaper designed to meet the requirements of manufacturers having a large number of gears of one particular size to cut and which, although essentially a standard machine, can be adapted to many classes of work, has been brought out by the Fellows Gear Shaper Co., Springfield, Vt.

It is said to be applicable to special needs and to fulfill them as well, if not better than a special-purpose machine, and, therefore, at considerable less expense. It is a production tool in that a large variety of gears can be handled simply by using suitable work-holding fixtures. Provision has been made also for handling both external and internal work; and to secure feeds and speeds best suited to the work in hand. A special feature is that it can take roughing and finishing cuts, automatically, in one setting and with the same cutter.

The machine is designated the No. 7, and the principle of operation is the same as the standard gear shaper in that a gear-type cutter is used, which works

roughing and finishing. This, it is pointed out, is the fundamental reason why this is eminently a high production machine.

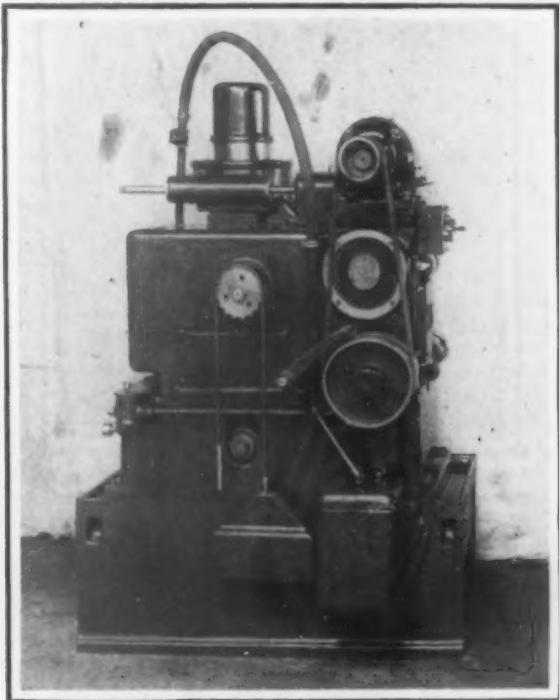
The cutter spindle is of light weight and guided in a straight path by guides, in a manner similar to the standard machine. It is reciprocated by a connecting rod and crank arm of light weight, as shown in the illustration, the operating end of the crank arm having a hardened steel segment gear meshing with rack teeth in the cutter slide. The crank arm is bronze bushed at the fulcrum point, and provided with ball bearings where the connecting rod attaches. The connecting rod operates through a crank shaft carrying an adjustable crank pin, the position of which governs the length of stroke of the cutter. The lower end of the connecting rod is mounted on a self-aligning ball bearing on the crank pin, an arrangement permitting high reciprocating speeds.

One-Hp. Motor Sufficient for Single Machine

The crank shaft is made from an alloy-steel forging and driven from the rear by a single-pulley drive, so that several machines can be grouped and driven through a jack shaft, no countershaft being necessary. Provision has been made for individual motor drive,



Front View Showing Guards Removed, Exposing Operating Members



Rear View Showing Motor Drive Arrangement, Driving Mechanism and Cutting Compound Tank

on the generating principle. The improvements incorporated in the new machine, however, are said to make possible the application of the old principles in a more effective way. Because of the high speed of the cutter, and also the short strokes, ganging of gears, excepting very thin ones, is unnecessary. Several advantages are claimed for this, among which is that from the standpoint of accuracy it is better to cut one gear at a time, it being difficult to secure accurate gears when holding a large number on an arbor or fixture at one time. Another advantage lies in the fact that the cutter, having a comparatively short stroke, can be operated at high speed so that it remains in contact with the work for so short a time that the cutter does not heat up, nor does the work. As a result the cutting edge remains keen and the same cutter can be used for both roughing and finishing cuts. Cutting compound is pumped to the cutter and the work, keeping them cool and permitting the rapid cutting of alloy-steel gears. Instead of using heavy feeds and slow speeds for roughing, and higher speeds and finer feeds for finishing, the new machine is designed to operate at exceptionally high speeds, so that by taking fine feeds the life of the cutter can be increased and its cutting edge not impaired, allowing the use of the same cutter for

and a 1-hp. motor provides sufficient power for operating a single machine. When a group is installed the bases are bolted together and the machines operated as a unit, one 6-hp. motor furnishing power for ten machines.

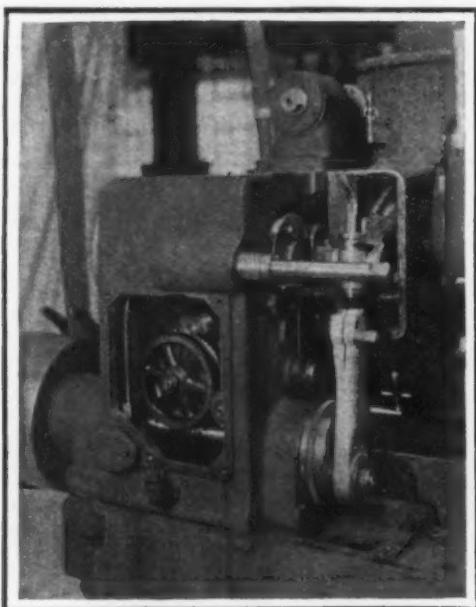
The saddle carrying the cutter slide is adjustable for different diameters of gears through a worm, worm wheel, pinion and rack, and can be withdrawn for locating and removing the work. It is held on guides on the face of the bed as shown. For the depth feed, the saddle carrying the cutter is advanced toward the work by means of a feed cam, on which provision has been made for automatically taking roughing and finishing cuts. The cutter is gradually fed into depth as the blank and cutter are rotated together, the cutter overlapping on the finishing cut so as to eliminate the possibility of variations in the thickness of the teeth.

The work spindle is the same as in the standard gear shaper in that it carries a reverse taper work arbor, and is rotated by means of a worm and index wheel, which are directly connected through gears, vertical and horizontal shafts to the upper worm and index wheel operating the cutter. It is held in an apron, in a seat in the bed. The work is withdrawn from the cutter on its return stroke by a relieving mechanism,

which differs entirely from that used on the regular machine in having a cam located at the rear which operates the apron lever through a connecting rod.

The proper relation between the number of teeth in the cutter and that in the work is secured through change gears. The upper and lower worm wheels have the same number of teeth, the ratio between the cutter and work spindles being therefore 1 to 1.

On the new machine the time for completing a gear is governed by the speed at which the cutter spindle is operated, in conjunction with the feed gears located inside the machine, the latter being accessible by removing a plate. The rotary feed is expressed as so many strokes of the cutter per revolution, and the gears provided give seven different feeds, ranging from coarse to fine. The coarsest feed is 435, which means that the cutter would make 435 strokes per revolution of the cutter. The finest feed is 1735, the feeds between be-



Close View Showing Plate Removed, Exposing Feed Gears, Crank Shaft, Connecting Rod, Crank Arm and Feed Cam

ing 730, 893, 1088, 1162, and 1418. Roughing and finishing cuts are taken at the same feed and speed.

Careful provision has been made for adequate lubrication. High-speed shafts are mounted on ball bearings and are automatically lubricated. A reservoir holding 2½ qt. is located in the bed from which oil is pumped to additional reservoirs, and from these the oil is carried down to the different bearings by wicks. The cutter-spindle shoe and guide are oiled by a reservoir in the saddle housing, which is exposed by removing the helmet. This reservoir in turn has wicks leading from it to the various bearing points. Another reservoir is located on the apron and is filled by unscrewing the cap. There are only three grease cups used, because, for a slight oscillating movement, grease is more satisfactory than oil.

This high-speed gear shaper will handle any form of gear entering into a standard automobile transmission, as well as some of the special designs. In adapting it to cutting internal gears, a slight modification is necessary. The cutter must work on the right-hand side of the center of the work spindle instead of on the left-hand side, and for this reason, a special crank arm is necessary. All the other members of the machine, however, are the same, and this is pointed out by the makers as showing the possibilities of this type of machine, which, up to a certain point, is a special-purpose machine, but by modifications may be increased in range and retain its unusual production possibilities.

Helical and herringbone gears may be produced quickly and accurately by slight modification. The alterations involve the use of helical in place of spur guides, helical instead of spur cutters, and provision in the machine for changing over for cutting right and left-hand helices.

Research Investigations on Molybdenum, Cerium and Zirconium Alloy Steels

The United States possesses the largest known deposits of molybdenum ores, but it is relatively poor in high-grade deposits of some other important alloying elements used in alloy structural steels such as automobile steels, says the Federal Bureau of Mines. Nickel, chromium and vanadium are the standbys in present-day alloy steels. Of these we have very little nickel; some chromium, mostly in relatively low-grade ores; and only small deposits of vanadium. It is of utmost importance to know to what extent molybdenum can replace any of these elements. According to tests made by H. C. Chandler and C. H. Willis, given wide publicity by producers of molybdenum, that element as an alloying material ranks with nickel, chromium and vanadium in preparing steel of high quality. Molybdenum steels found some use during the war.

In order to corroborate the published tests, to extend them and to study in detail the shock and fatigue-resisting properties of molybdenum steels, a co-operative agreement was entered into by the Bureau of Mines with the Vanadium Corporation of America, producers of molybdenum, by which the services of R. J. Thompson, metallurgist, were made available. The co-operation of the Wyman-Gordon Co., Worcester, Mass., was enlisted in making impact and repeated-impact tests.

A comprehensive series of molybdenum steels, and of other steels for comparison, has been made in the electric furnace laboratory of the department of chemistry at Cornell University and rolled at the Halcomb Steel Co.'s plant, Syracuse, N. Y., and test bars were machined, heat treated and given tensile and fatigue tests in the shops and laboratories of the Sibley School of Mechanical Engineering at Cornell University.

Attention has been paid to the effect of molybdenum on the critical cooling ranges of steel. These investigations are well under way, though much of the fatigue-testing work remains to be done. Since it was begun, a good deal of information, all favorable to molybdenum steel, has been published by steel makers, but very little has been published on impact tests and nothing on fatigue tests. This work should add materially to the knowledge of the properties of these steels.

Cerium compounds are a by-product of the gas-mantle industry. They find limited use as an ingredient in the cores of flaming-arc carbons and, reduced to metallic form, in the pyrophoric alloys used in cigar lighters. In order to study the effect of cerium on steel and non-ferrous alloys, a co-operative agreement has been made by the Bureau of Mines with the Welsbach Co. The work on cerium steels has been carried along with that on molybdenum steels and in a similar manner. It has been established that cerium can exert a desulphurizing action. There are, however, some difficulties in the preparation of these steels and no final conclusions can yet be drawn as to their value. The effect of the addition of cerium to various non-ferrous alloys is also being tried.

In the work on special alloy steels conducted at the Ithaca, N. Y., office of the Bureau of Mines, situated at Cornell University, under the direction of H. W. Gillett, chief alloy chemist, the co-operative work with the Navy has been completed, and considerable progress made in the investigations on molybdenum and cerium steels.

In the past fiscal year the work done on the preparation of zirconium and other steels for the Navy was mainly analytical and was performed for the most part by Lieut. R. McLane and Lieut. J. P. Jenkins of the Navy Department, working with the advice of Dr. E. L. Mack of the Ithaca office. The results brought out the advisability of some changes in methods of analysis for zirconium.

The data on recovery and segregation of various alloying elements in steel has been incorporated in Bulletin 199, now in course of publication. The work for the Navy was finished in the late fall of 1920. The Navy's ballistic tests of the plates made from these steels are still in progress.

Labor Troubles of the Colorado Fuel & Iron Co.

Unshaken Faith in Collective Bargaining as Provided in the Industrial Representation Plan—Colorado Industrial Commission Sustains Employer

DENVER, Dec. 8.—Owing to the fact that an employee representation plan is in force at the plants of the Colorado Fuel & Iron Co., much interest has been felt throughout the country in the recent troubles of the company with some of its employees. A statement of the facts is, therefore, in order.

Late in the summer, after curtailments of operations at the steel works and lack of orders, particularly for commercial coal, had made it necessary for the company to shut down several of its mines and reduce the working time at others, a number of employees in the Trinidad district circulated petitions for a return to the wage scale of 1917-1919. These petitions were signed by a majority of the employees at all the operating mines in the Trinidad district and at some of the mines in the Walsenburg district. In the latter stages of this process, superintendents at some of the mines were active in circulating the petitions. After these petitions had been signed, the employees' representatives from the mines concerned held a meeting and signed a resolution asking the company to put the new wage rate into effect. The reduction was accordingly announced effective Sept. 1.

Union Ordered Strike

Officers and organizers of the United Mine Workers of America ordered a strike in protest against this reduction and at the same time complained to the Colorado Industrial Commission that the company had violated the law in that it did not give 30 days' notice before changing the wages. This strike was partially effective at some of the mines.

The industrial commission held a hearing and issued an interim order, under which the former scale of wages was restored, pending the final award, which upheld the action of the company and the methods of collective bargaining including in the industrial representation plan. Acting under this decision, the company, on Nov. 17, again put into effect the reduced wage scale at the mines where it had been agreed to by a majority of the employees before the industrial commission hearing.

The union again called a strike, not only in the mines affected by this reduction, but at all the other mines of the company. This strike was at first quite largely effective in the mines of Huerfano County and much less effective in Las Animas County. Since then the men have been returning to work until the working force in Las Animas County is practically normal and that in Huerfano County is very considerable, being entirely normal at one or two mines.

Rather oddly, the strike was much more effective at the mines where no reduction in wages had been proposed than at the mines directly affected by the wage decrease.

At about a half dozen mines where no reduction in wages had been made, most of the men were still out several days after the strike had been called and these mines have been closed by the company, as the now operating mines give all the coal needed for all purposes. A few days after the strike was called, one of the mines at which no wage reduction had been made and at which the strike had been moderately effective, the men held a meeting and by a large majority voted to ask the company to reopen the mine at the reduced wage scale. Later, at another mine under similar circumstances, the men voluntarily circulated a petition to the same effect.

The Company's Position

The company justified its action in reducing miners' wages by agreement with its employees for the following, among other reasons:

1. The need for reduced costs at the steel works in order to enable the company to accept orders in competition with Eastern plants, many of which are operating on a fuel cost basis at least as low as that brought about by our wage reduction. In this connection, the company considered the fact that several thousand steel workers in its Minnequa plant have been out of work or working very unsteadily for a number of months.

2. The need of the public for cheaper domestic and commercial fuel.

3. The fact that in many of the mines, the reduced wage rates will result (and in fact have already resulted) in more work for the miners and consequently higher earnings than they would have made if the old rates had remained unchanged.

The strike, insofar as it has been effective at all, has been entirely peaceful and seemingly there has been little hard feeling on the part of anyone.

"We believe," says an official of the company, "that the decision of the industrial commission wholly justifies the action of the company in negotiating a wage decrease by agreement with its employees and vindicates the methods of collective bargaining provided in the industrial representation plan. We also believe that the fact that most of our men either refused to go on strike or returned after a very brief period, indicates that the workmen are satisfied with their relationships with the company."

The Open Shop Policy in Dallas

Two years ago, building was at a standstill in Dallas, Tex., because of the closed shop discriminating policies of radical union leaders. These policies helped increase building costs and caused unemployment. The laboring man and his family suffered. So did the Dallas public.

At the urgent demand of local building contractors and others this situation was presented to the members of the Chamber of Commerce who recommended practically unanimously that Dallas declare for the open shop and that an organization be perfected to establish and maintain open shop principles. This was done.

The open shop in Dallas means no discrimination against, or in favor of, union or non-union men. It means equal employment opportunities for both. It has given the laborer steady employment, has freed the building contractor from discouraging domination by walking delegates, has reduced building costs thus encouraging property owners to proceed with building projects, and has protected the public from injurious effects of strikes and other "labor disputes." Dallas is now one of the two leading cities of America in per capita building construction.

Sixty-five per cent of the total building operations during the past year has been built on the open shop basis. Production to the value of \$93,650,000 comprised the record of Dallas factories for the year 1919, as announced by the bureau of census. Ninety-eight per cent of the manufacturing interests operate on the open shop basis.

The Dautrick-Johnson Mfg. Co., 5065 Rohns Avenue, Detroit, has installed machinery to manufacture hardware and woodwork for the over-head door. The contract for channel track and pulleys has been awarded. The company expects to have representatives or distributors in every part of the United States.

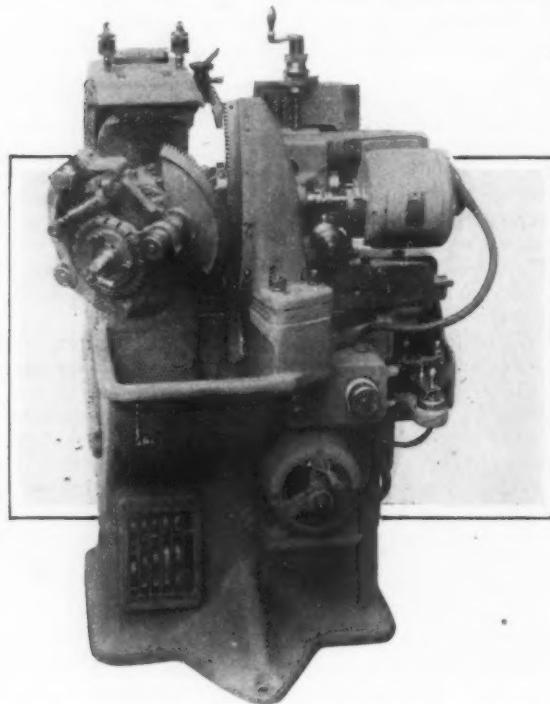
The Autoware Corporation, Detroit, has changed its name to the Metalware Corporation.

Four-In. Spiral Bevel Gear Generator

The Gleason Works, Rochester, N. Y., has developed a small size gear generator intended primarily for the production of small spiral bevel gears in manufacturing quantities. The accompanying illustration shows the machine, which may be noted as differing in many respects from the same type of machines previously brought out by the Gleason Works.

In this design the number of parts has been reduced to a minimum, which was possible because of the fact that it is intended chiefly for manufacturing purposes.

Among the outstanding features are: The generating motion or roll is all on the work spindle and its carrier; the feed motion is on the cutter spindle carrier only; and the relative roll between the work spindle



The Generating Motion or Roll Is All on the Work Spindle and Its Carrier

and the cutter is controlled by a crown gear and segment. Two motors are used to drive the machine, one for the cutter, the other for the feed and roll. Indexing is automatic and is actuated from the roll motion.

The machine is primarily intended for finishing from the solid, finishing both sides of a tooth space with one generating cut by the duplex spread blade method. The feed cam used is what is known as a "completing cam." The cycle of operations controlled by this cam are as follows: The cutter just before reaching the top of the up roll of the work starts to withdraw. On the down roll, the cutter is swung clear of the work, while the indexing takes place and then is gradually advanced into the work during the remainder of the down roll. The cutter does not reach the full depth of the tooth until just after the beginning of the up roll. The remainder of the up roll finishes the profile. Although the motion of the cam described is best adapted for use with a spread blade cutter for finishing from the solid, it can also be used with reduced roll to rough out gears of the larger pitches, and finish the roughed blank by either the duplex spread blade method or single side method.

The time per tooth ranges from 5 to 26 seconds. The cutters range from 1 1/10 to 3 1/2 in. in diameter. The small cutters are made solid and have four blades, two cutting on the inside and two the outside, the larger cutters having eight adjustable blades, four cutting inside and four outside.

The machines are regularly furnished with a set of 8 cutter speed change gears; a set of 12 feed change gears; a set of 11 segments; one index plate; a cutter gage; and the necessary wrenches. An automatic stop and a gear-driven cutting-oil pump are also included. The net weight is 2000 lb.; floor space, 33 x 46 in.

Fabricated Steel Improvement Maintained

The November volume of contracting in fabricated structural steel work totaled 99,800 tons, so that the improvement noted in October, for which the total was 97,800 tons, has been maintained. The figures were supplied by George E. Gifford, secretary Bridge Builders and Structural Society, New York, and show that in November contracting throughout the country was equivalent to 55 1/2 per cent of the capacity of the bridge and structural shops.

The volume of business in both October and November was better than that of any other month of 1921, but the two month average, 98,800 tons, is barely any better than the monthly average for all of 1918 and 1919. The monthly average for the eleven months of 1921 is 62,400 tons, contrasted with 89,150 tons, the monthly average for the two lean years of 1913 and 1914.

George W. Upton Again Named

WASHINGTON, Dec. 20.—President Harding recently re-submitted the name of George W. Upton to the Senate to be a member of the Federal Trade Commission. This was necessary because no action was taken on this nomination at the special session. There is considerable opposition in the Senate to Mr. Upton on the ground that residence near Pittsburgh, at Warren, Ohio, might make him favorable to maintaining the Pittsburgh base.

Safety Code Grinding Wheel Guards

The Builders Iron Foundry and the Diamond Machine Co., Providence, R. I., have placed on the market wheel guards of the type shown in the illustration, especially adapted for use on the machine department's grinding machines, but applicable also to any standard make of grinder.

The guards are known as the Safety Code Wheel Guards and are said to have been designed in strict accordance with the recommendations of the May, 1919, safety committee report of the National Tool Builders Association. Careful study was given to proper materials, correctly sized openings, sufficient thickness of walls, protection for spindle ends, means of easy removal of the wheel, means of adjusting the guard to correspond with the decrease in wheel diameter, rigid attachment of all parts, proper exhaust connection and neat appearance.

In producing the guards, a close grained high tensile strength gray iron is used. They are made to apply to grinding wheels having 10, 12, 14, 16 and 20-in. diameter, but can be furnished in fabricated steel for larger sizes, according to specifications. The thickness of the guard side wall on the regularly manufactured sizes ranges from 5/16 to 5/8 in.; the thickness of the circumferential wall from 3/8 to 1/2 in.; and the inside width from 2 1/8 to 5 1/8 in. The approximate weight of the size for a wheel with a 10-in. diameter is 28 lb.; for a 12-in. wheel, 38 lb.; for a 14-in. wheel, 62 lb.; for a 16-in. wheel, 80 lb.; and a 20-in. wheel, 175 lb.; while the area of each exhaust opening is 6, 11, 11, 14 and 27 sq. in., respectively.



The Guard Is Adjustable to the Decrease in Wheel Size

All of the 23 hot tin mills at the Laughlin plant of the American Sheet & Tin Plate Co., Martins Ferry, Ohio, are in operation for the first time since last April. Three idle mills were started up Dec. 18, at midnight.

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ESTABLISHED 1855

THE IRON AGE

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"Open Competition" Unlawful

The decision of the Supreme Court of the United States against the so-called open price competition plan of the American Hardwood Manufacturers' Association will have far-reaching effects on all business organizations which seek directly or indirectly to stabilize prices. It is not surprising that it has been received with enthusiastic commendation by investigators who have been looking into the methods of numerous associations with a view to prosecution under the Sherman anti-trust act. It seems most improbable, however, that the opinion of the association's counsel that the decision will render it impossible for industrial groups to study their economic problems will be borne out. While the full opinion is not yet available, the main points were clearly stated by Justice Clarke. One effect will be to make it necessary to depend to a greater extent than ever upon trade paper quotations, which will be virtually the only source of general information among manufacturers and distributors as well as buyers.

It is noteworthy that in the dissenting opinion, Justice Brandeis, who was ranked as a radical before he was appointed to the Supreme bench, is associated with Justice Holmes, who has had similar leanings, and with Justice McKenna, an old-fashioned conservative. The dissenting opinion of Justice Brandeis takes a strong position in favor of permitting information as to prices and of sanctioning research rather than gambling and piracy. He also sees no harm in manufacturers and dealers prophesying as to what prices will be. He is right in holding that often small concerns bring about disastrous competition on account of their ignorance of costs.

Justice Holmes, in adding his observations to the dissenting opinion, goes even further than his associates as to the extent to which the decision will prohibit activities of business men in association with one another. Whether the fear of Justice Brandeis will be realized, that the decree will lead to further consolidation and centralized control of industries, time alone can tell. For some months there have been plentiful signs

of a new crop of consolidations like that of the late eighteen-nineties. It is more probable that for a time at least the principal effect of the decision will be to encourage keener competition and lower prices on many products.

Justice Brandeis, in his dissenting opinion, holds it to be extraordinary that in this Hardwood Association case the Supreme Court should alter its decision in the United States Steel Corporation case, where 50 per cent of the industry is controlled, and in the United Shoe Machinery case, where nearly all the shoe machinery of the country was controlled, holding them not in violation of the Sherman law, and should hold that 319 out of many thousand hardwood operators "cannot exchange information without running counter to the provisions of the Sherman law." It must be said that the Supreme Court decisions in cases brought under the Sherman law have left the act with most of the ambiguity that has inhered in it from the beginning. The rule of reason, as laid down in the Standard Oil decision of 1911, has taken a wide range, so that each case has been found to differentiate itself in some particular from all others. It is plain that the administration of anti-trust laws is still far from such a basis of dependability as will make it possible for business, big or little, to know in advance that an intended course of conduct will not end in fine or imprisonment or both.

Increased use of the inland waterways is making a strong appeal to Pittsburgh district steel companies as a means of offsetting the freight rate advantage enjoyed by farther western plants on western and southwestern business. Now that the Pittsburgh basing price is being more recognized in the breach than in the observance in the Chicago district, producers there have been passing along to customers in the West and Southwest all or a part of their advantage of more than \$7 per ton. It is some time, indeed, since "f. o. b. Pittsburgh" has appeared in sales contracts, except of companies in the Pittsburgh district. One Pittsburgh company in the past two months has made two large shipments of finished

steel down the Ohio River, the first amounting to 3500 tons and the second to 12,000 tons, while another independent in that district has made a good-sized shipment by the river route. The use of the waterways has been the subject of considerable investigation also by the Steel Corporation, in the Pittsburgh district, not only with a view to long-distance shipments, but for inter-plant transfers and for supplying Pittsburgh district customers located on or close to the rivers.

More Use of Coke-Oven Gas

The substitution of coke-oven gas and tar for other fuels in open-hearth steel operations is one of the most important of recent metallurgical developments. The extent to which both have been used in this manner is discussed on other pages. From the viewpoint of elimination of waste, such substitution is of large importance, since coke-oven gas and tar are by-products. In the determination of cost they are a vital consideration, as they are substitutes for other fuel costing much more. In efficiency they are not surpassed. From small beginnings a few years ago, the two by-product fuels accounted for nearly 25 per cent of the ingot production of 1920, being second only to producer gas.

A recent analysis of the British coke-oven industry is of interest in this connection. According to the London *Ironmonger*, "the coke-oven gas evolved in one year in Great Britain is 145,000,000,000 cubic feet. While much of this is used for heating the ovens themselves, as well as for steam raising and the generation of power in gas engines, no less than 805,000,000 cubic feet is wasted by discharge into the atmosphere." What the general use of coke-oven gas would mean in eliminating waste and in lowering cost of production of British steel can be readily computed.

Before the war the production of by-product coke was considered to be more general in Germany than in any other country. It was the basis of the color and other industries. Though it is not known to what extent by-product fuel was a factor in the German steel output, it is not unreasonable to suppose that this advantage was not lost sight of and that its effect on costs was far-reaching.

Thus far the employment of coke-oven gas and tar at steel works in this country is confined to the large companies which operate their own coke ovens. These fuels may become available for smaller steel plants, however. There are signs that the more general production of coke and coal gas in smaller industrial by-product units may be a development in the near future. The location of such units near smaller open-hearth plants would be of mutual advantage.

Japanese buying of black sheets has been for some months a feature of American export trade. Of the total of sheet exports to Nov. 1, this year, 122,120 gross tons, Japan has taken 66,250 tons, or 54 per cent. And of this total about 45 per cent was exported in September and October. The movement has been far more extensive than

ever before, Japan's purchases of this product having been only about 38 per cent of the total exported in 1920 and much less in the war years. In 1913, when exports of sheets alone were 140,637 tons, Japan took only 7258 tons of sheets and plates together. It is understood that the sheets that have been going over the Pacific in recent months are being galvanized by the Japanese for building and other uses. The increased galvanizing operations yonder are indicated by the fact that of the small exports of zinc from this country in the first ten months of the year, Japan has taken 68 per cent. The story as to sheets could be duplicated in other products, all pointing to the increasingly important place Japan is taking as a customer of the United States.

Price Readjustments

It would be very agreeable to business interests as a whole if prices of the various classes of commodities were adjusting themselves to a normal and natural relationship, such as would represent stability and thus furnish a basis upon which business could proceed with confidence. As has often been pointed out, not only lately, but before the war, what business requires, in order to maintain confidence, is not so much a given price level as an assurance that prices are going to be reasonably stable. Furthermore, it has been urged often of late that in these post-war times it is not necessary that there should be a return to any particular price level of pre-war times, the important thing being that there should be reasonable relationships between prices. Business can adjust itself to a lower or higher purchasing power of the dollar, provided the dollar is of substantially equal value whether one thing or another is bought. The point applies particularly to one's sales and purchases. Thus, to use the most common illustration, the farmer wants to buy and sell in dollars of the same value.

The Bureau of Labor's indices of commodity prices at wholesale are carefully conceived and compiled and are considered trustworthy. The statement for November has just been issued. Using 1913 average prices as 100, the index number for all commodities has shown scarcely any fluctuation since last May, being reported as follows:

May	151
June	148
July	148
August	152
September	152
October	150
November	149

Thus the variations in the average price of all commodities have been trivial. It might be guessed that one of two things had occurred—that the various commodities individually had fluctuated but little in the six months, or that the commodities that had had the greatest decline had recovered part of the decline, this being balanced by declines in commodities that were far too high last May. Neither guess, however, would be correct. There has been no such consistency,

as the following comparison of index numbers by groups of commodities will show:

Index Numbers in 1921		
	May	November
Farm products	117	114
Food, etc.	133	142
Cloths and clothing	181	186
Fuel and lighting	194	186
Metals and metal products....	138	119
Building materials	202	197
Chemicals and drugs	166	162
House-furnishing goods	262	145
Miscellaneous	151	145
All commodities	151	149

Generally speaking, the lower priced goods have stayed down and the higher priced goods have stayed up. The lowest priced group of all last May, assuming that 1913 prices showed proper relations with each other, was farm products, standing at 117, and they declined still further, to 114 in November. Well down in the list in May was "metals and metal products" and they likewise declined further in the following six months. It is true that the groups that were highest priced of all in May did decline, but they did not decline to anything like the general average, the two highest groups being building materials and house-furnishing goods. Even now one is practically double priced, as compared with 1913, while the other is more than double priced, when commodities as a whole are at one and a half prices.

Of course there are reasons for these failures to adjust, though the reasons may not be in all cases easy to discern. One thing is clear, that there has been a better demand for building materials than for metals, and building materials, high last May, have stayed up, while metals, relatively low last May, have declined still further.

This exhibit runs counter to the argument sometimes made that steel products, already low priced, would be in better demand if they were lower priced still.

Steel for the Farm

A quarter in which demand for steel has been conspicuously light in the past year is the farm. Normally the farm has furnished a very important outlet for the steel mills. A substantial proportion of all the wire and sheets produced passes to the farm, which also requires respectable quantities of pipe, while agricultural implements represent a wide variety of steel mill products. Since the total amount of steel produced varies greatly from year to year, and the proportionate distribution to different quarters also varies widely, it is not practicable to attempt an estimate of the "normal" steel requirements of the farm. The frequent statements made of the proportion of the total steel output "normally required" by the railroads furnish a horrible example to any who might contemplate attempting to make an estimate for the farm, for no period of years in railroad work can be accepted as representing a normal condition. The railroads buy steel and steel goods as circumstances require and permit, and it is much the same with the farmer.

Sometimes the farmer has money to spend, sometimes he has not. When he has money he

can elect whether he will spend the money in improving his farm or adding to his household goods or buying a flivver.

As to the farmer having no money to spend at the present time, the news has been very thoroughly circulated that farm products have had a greater "liquidation" in prices than commodities in general; but that is not the whole story by any means. In 1917, 1918 and 1919 farm products were much higher than commodities in general, taking 1913 as a basis, in accordance with the practice of the United States Bureau of Labor. It follows that if, instead of taking 1913 as basis one should take the average 1913 to 1919 inclusive as basis, present prices of farm products would appear still more out of line with prices generally. The intervening years were full of events, giving men new ideas and viewpoints. A wave of the hand will not cause the farmer to revert to the mental attitude he held in 1913. As is well known, he is not particularly prone to take gratuitous advice. The farmer thinks in terms of 1918 and 1919, as to what he could secure in exchange for a given quantity of his product, and by this comparison the return now offered is particularly poor, decidedly poorer even than appears by a comparison with conditions in 1913.

The extreme of the disparity was reached in May, 1919, according to the Bureau of Labor's compilation of wholesale prices. Using 1913 average prices as base, or 100, farm products stood at 240 and commodities in general at 207 in May, 1919. The divergence steadily lessened until in January, 1920, farm products passed below the general average, being 246 against 248 for all commodities. Since then, as every one knows, the farmer has been worse off than in 1913 as to the purchasing power of his products, but an important point is that for three years previous he had been better off, and in those three years he acquired habits and viewpoints.

The farmer is now indisposed to spend money, if indeed he has it. He is not disposed to make nice distinctions. It might be argued with him that, while commodities in general stand at 50 per cent above their level in 1913, steel products are up only 27 per cent, so that he should buy steel at any rate. The 27 per cent, however, is computed by the use of prices at Pittsburgh. Prices delivered on the farm in steel and manufactured wares would undoubtedly show a considerably greater advance, on account of advanced freight rates and much higher costs in the conversion of steel into wares for actual consumption. The steel industry suffers now from a lack of farm demand for steel, although it is not responsible for the situation.

The 1921 British pig iron output promises to establish a record of unemployed capacity never equaled by any other large producing country. The total production will be so small that one must go back 70 years to find a parallel. Probably the final figures will not exceed 2,500,000 gross tons, matching the 2,249,000 tons of 1850, the days before the Crimean war, or not more than American blast furnaces did in a single

month in the early part of so bad a year as 1921. Reckoning Great Britain's annual capacity at 12,000,000 tons, 1921 is about a 20 per cent year. Chief among causes for this pronounced falling off are labor troubles, particularly the coal strike, with its prohibitive prices for coke. British exports of pig iron have dwindled and imports have been on a scale never before known, amounting to no less than 121,700 tons in September and 92,000 tons in October. Of the latter total 15,000 tons came from Germany, while France and Belgium supplied about 70,000 tons.

Rate Hearing at St. Louis

J. R. Stroh, manager of the mining and transportation departments of the Brier Hill Steel Co.; William H. Welsh, assistant traffic manager of the Youngstown Sheet & Tube Co. and H. D. Rhodehouse, traffic manager of the Youngstown, Ohio, Chamber of Commerce, represented Mahoning Valley steel companies last week at a hearing conducted by the Southwestern Freight Association, held in St. Louis. These representatives and others from Pittsburgh contended that rate concessions demanded by Chicago, St. Louis and Birmingham steel manufacturers to Texas common points will react to the disadvantage of producers in the Youngstown and Pittsburgh districts, unless there is a proportionate reduction in the differential between these districts and St. Louis. The rates apply to a variety of finished and semi-finished products, except pipe and wire.

Chicago, St. Louis and Birmingham interests requested that the present rate on plates, bars, angles, sheets and other products between St. Louis and Texas common points be reduced from \$1 per 100 lb. to 74c. Manufacturers at Pittsburgh and Youngstown have no objection to this revision in the base rate, provided there is a proportionate cut in the differential of 25½c. from Pittsburgh to St. Louis. Under the proposed rate, Birmingham and St. Louis steel manufacturers will be able to ship to Texas points at a rate of 75c. per 100 lb., and Chicago interests at a rate slightly higher. Representatives from Pittsburgh and the Valleys asked for a reduction in the differential between Youngstown or Pittsburgh and St. Louis, which would restore the original relationship between the rate east of St. Louis to that applying from St. Louis to Southwestern points.

Arizona Law Invalid in Part

WASHINGTON, Dec. 20.—The Supreme Court yesterday in a decision read by Chief Justice Taft held the Arizona law prohibiting injunctions against labor boycotts except where actual violence occurred to be invalid in part. The finding was similar in some respects to the recent decision of the Supreme Court, read recently by the Chief Justice, in the American Steel Foundries case.

The opinion of yesterday arose from the test case brought by William Truax, who conducted a restaurant in Bisbee, Ariz., and who was boycotted because he refused to accept an eight-hour day demand. Truax had asked the Supreme Court, in an appeal, to declare the law null and void and to reverse the decision of the Supreme Court of Arizona which had refused to issue an injunction as the result of the action of the local union of cooks and waiters in beginning a secondary boycott, with picketing, of the eating house. The Chief Justice held that Truax was injured in his property rights.

Dissenting opinions were delivered by Justices Holmes, Pitney and Clarke who held that the State court interpretation of the statute should be affirmed because State legislatures have the right to enact laws dealing with strikes and boycotts without invading the Federal constitution. It was held by them that the Arizona State law did not discriminate against classes of citizens.

DECREASED ACTIVITY

Operating Schedules of Steel Plants in Mahoning Valley Show Reduced Output

YOUNGSTOWN, Dec. 20.—Operating schedules of steel plants in the Mahoning Valley clearly indicate the declining state of activity, with 22 of 51 independent open-hearth furnaces charged, and but 37 of 113 sheet mills under power. Production of tubular goods departments constitutes the one outstanding exception. Two sheet mill plants, that of the Newton Steel Co. at Newton Falls and the six-mill works of the Mahoning Valley Steel Co. at Niles, are wholly idle and will not resume until after Jan. 2.

Plate mill departments of the Brier Hill Steel Co. are idle this week. Bar mill capacity of the Republic Iron & Steel Co., which has been occupied for several weeks, is again on the inactive list.

The Youngstown Sheet & Tube Co. is operating seven open-hearth furnaces, Brier Hill Steel Co., three, Sharon Steel Hoop Co., three, Republic Iron & Steel Co., six, and Trumbull Steel Co., three.

Sheet mills are operating on the following basis—Sheet & Tube company, 15; Brier Hill Steel Co., 4; Sharon Steel Hoop Co., 6; Trumbull Steel Co., Republic Iron & Steel Co., and Falcon Steel Co., 4 each.

Plans of R. D. Wood & Co.

From an item in THE IRON AGE of Dec. 15 it might be erroneously inferred that R. D. Wood & Co., Philadelphia, were no longer to continue in the line of business which the firm has conducted for years. The firm is not, however, affected by the sale of the Camden Iron Works and will continue to sell hydraulic machinery and design.

R. D. Wood & Co., as heretofore, will continue to manufacture gas producers and machinery at the Florence, N. J., works, where new shops have been built and specially equipped for this work. The personnel and engineering force are in no way affected by the transfer of work to the Florence shops.

R. D. Wood & Co. have been prominent in the hydraulic machinery field for over 30 years and were pioneers in the construction of the present form of gas producer. The business of the company extends back 118 years and during this long time only two generations have been in charge of it. Walter Wood is the present active head. In 1803, when the business was established, its product was pig iron made from the bog ores of New Jersey. When Philadelphia began to substitute iron pipe for the wooden log pipe of early days, a pipe foundry was established at Millville, N. J., the pipe being shipped to Philadelphia in schooners. About 1868 a larger works was built at Florence, N. J., the Millville plant being continued. About 1883 the company added to the Millville and Florence works by buying the shop at Camden previously owned by J. W. & J. F. Starr.

Output of By-product Coke Increases

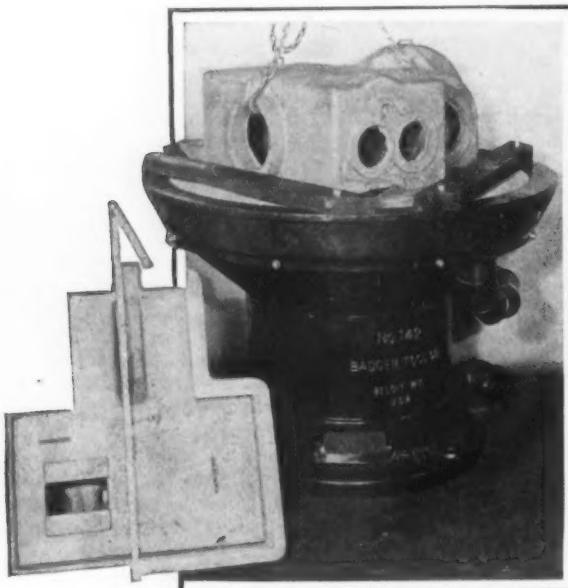
WASHINGTON, Dec. 20.—The output of by-product coke in November showed a slight increase, but was still 31 per cent short of the 1920 average, according to the Geological Survey. The total production for the month was approximately 1,766,000 net tons, as against 1,734,000 tons in October. The average production per day in November—a 30-day month—was 59,000 tons, an increase of 5 per cent over the daily rate for the preceding month. The percentage of capacity in operation during the month averaged 50.9, as against 85 or 90 per cent when the demand for coke is more active. Fifty-eight plants reported production, and 13 plants were idle throughout the month.

The Central Vermont Railway has announced a reduction in wages of all employees "to meet the general and insistent demand for reduction of railroad costs."

Vertical Spindle Disk Grinder

The accompanying illustration shows the new vertical spindle type of disk grinder of the Badger Tool Co., Beloit, Wis., in use for surface grinding the face of a large tractor transmission case and cover. The casting shown in place on the disk wheel is approximately 32 in. long by 28 in. wide and weighs 300 lb. The flange to be surfaced clean and flat is 2 in. wide, the total area to be surfaced being 250 sq. in. Stop bars are attached to the guard ring to prevent the work revolving with the wheel. The actual grinding time on this piece was 8 min., but by altering the pattern of the casting to conform to correct disk grinding principles, it is estimated that grinding time could be substantially reduced.

In this machine, known as the No. 142, the steel disk wheel is 42 in. in diameter and is faced with a special abrasive compound $\frac{1}{2}$ in. thick, molded directly to the wheel. Direct motor drive is used, the shaft of



Disk Grinder in Operation on a Tractor Transmission Case and Cover. The shaft of the motor serves as the spindle of the machine

the motor serving as the spindle of the machine. The motor used is 20 hp., operating at 600 r.p.m. Special dust-proof motor end yokes are provided, and positive forced-feed lubrication supplied to both radial and thrust ball bearings. A circular dust channel surrounds the periphery of the wheel, terminating in two openings to which the dust exhaust system is attached. Removing the outside guard ring exposes completely the dust channel. The machine is accessible from all sides, which in the case of smaller parts permits more than one operator to work on the machine simultaneously. The weight, complete, is 3800 lb.

Status of Problems of Rail Failures

WASHINGTON, Dec. 20.—W. P. Borland, chief of the Bureau of Safety of the Interstate Commerce Commission, in his annual report for the fiscal year ended June 30, 1921, says in part that "transverse fissures have not come to notice in the rails of street and trolley lines nor in the rails of elevated railways. Wheel loads of 15,000 lb. represent an ordinary maximum in the latter class of roads, while loads of 35,000 lb. are exceeded in steam-railway equipment. Without doubt some rails will endure greater stresses than others, due in part to chemical composition and in part to structural state. Therefore a joint inquiry into chemical and structural conditions, together with those which relate to wheel pressures, is desirable in the comprehensive investigation of this subject."

"It is the part of good engineering practice to adjust the working stresses on structural members so as to retain a margin of safety against usual variations

in the properties of the materials which are being used. Such a precept should find place in designs of motive power and equipment, which establish what the wheel pressures shall be. Increase of weight of rail, while possessing advantages, is not the final solution of the problem. The intensity of the impinging pressures between the wheel and the rail is a prime factor in certain types of failures and a factor which increase of weight of rail does not fully provide for. The practical difficulties which obstruct a return to lower wheel pressures are obviously very great. But no grade of steel has been found capable of enduring present wheel pressures without loss or impairment of physical properties.

"The rail situation during the past year has been characterized by one unusual feature, namely, an effort has been made by means of heat treatment to impart to a moderately hard steel superior endurance against abrasion and wear. A change in the micro-structure of the steel is effected by the heat treatment employed, which has given promise of increasing its endurance against abrasive action. The accomplishment of such a result is an economic feature of importance. Heat treatment of steel involves the proper control of internal forces, particularly during certain stages of quenching. Questions pertaining to safety are thus associated with the results on the modifications in physical properties having for their object increased durability against wear.

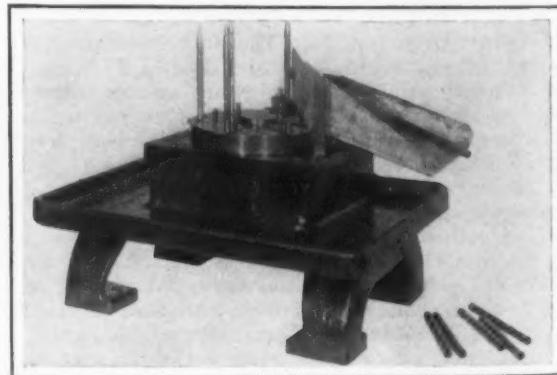
"The past year has been comparatively free from serious accidents which have attended the failure of rails in earlier years. A well-maintained track, with sound ties and well-driven spikes, furnishes visible evidence of safety against rail fractures, such as do not give warning of the approach to rupture."

The report states that the Tri-City Steel Tie Co.'s ties as installed on approximately one mile of track on the Pennsylvania Railroad near Atglen, Pa., were inspected in July, 1920, shortly after their installation, and again in April, May, and July of 1921. Further observations are necessary to determine the effect of service upon these ties.

Marking Machine for Small Tubing

A new machine for marking the name and patent marks on the tubing of pencils or other small tubing and which is said to represent a slight departure from the usual method of handling such work, has been placed on the market by the Noble & Westbrook Mfg. Co., Hartford.

As shown in the illustration, the top or table is di-



Machine for Marking Name and Patent Marks on Small Tubing

vided into six equal parts, each having a mandrel upon which the work is fed by hand. The table revolves, passing the die over the work and making the mark, after which a cam raises a small lever and takes the work from the machine automatically. A production of over 10,000 per day is estimated by the makers. The machine weighs approximately 90 lb. and is made special for the job. It can also be furnished for marking on the end of any size tubing of short lengths.

Arguments Made in Cost Reporting Case

Attorneys for Iron and Steel Producers Oppose Those of Federal Trade Commission on Motion to Strike Out Amended Answer

WASHINGTON, Dec. 19.—Arguments were made last Thursday before Justice James Bailey of the Supreme Court of the District of Columbia on the motion filed the day previous by attorneys for the Claire Furnace Co., et al., to strike out the entire amended answer or certain portions of it, filed by the Federal Trade Commission in this cost reporting case. The arguments by Attorneys Levi Cooke of Washington and A. Leo Weil of Pittsburgh, representing the Claire Furnace Co., and 20 other coke and iron and steel producers, and by Attorney William Wallace, Jr., counsel for the Midvale Steel & Ordnance Co., had as their object the simplification of the issues so that the underlying principle of the case, the right of the commission to require the desired data from producers, might be determined quickly and the matter fought out in the courts. It is believed that regardless of the outcome of the proceedings before Justice Bailey, the case will be taken to the Supreme Court of the United States. Justice Bailey is expected to make a ruling within a few days on the arguments on the motion to strike out, but it is not believed that the hearings will be begun before January. The character which they take will depend upon the ruling on the motion to strike out.

Merely for the purpose of clarifying the issue and reducing it to its main points, attorneys for the producers conceded that the expense of compiling and submitting monthly reports to the commission will not be unduly burdensome. However, this point no doubt would be combatted should it appear as one of the factors in the case.

Claims of Steel Interests

As stated in the motion to strike out, attorneys for steel interests based their arguments on the claim that the amended answer of the commission contained improper allegations, introduced new and contradictory defenses, and set up claims as to the rights of the commission to get the data required that went outside of those which were made in the original complaint. Contentions to this end were made by Attorney Weil in opening the arguments. Moreover, he pointed out that every question of law set up had been decided by the courts against the Federal Trade Commission which had not taken appeals. The cases in which these decisions were made, Attorney Weil pointed out, were those relating to the Maynard Coal Co., and the Basic Products Co. But in spite of the denial by Congress of the authority of the commission to compel the facts it desired in these two cases, Attorney Weil said, the commission is still attempting to force his clients to submit data which the commission has no authority to require. He said that he did not think it was right that his clients should be asked to submit to a long and tedious trial, the outcome of which will almost assuredly be decided against the commission.

It was indicated by Justice Bailey that he has not changed his opinion that the authority of Congress to regulate interstate commerce cannot be used by the commission in compelling monthly reports as to costs. This caused Attorneys Jesse C. Adkins and William T. Chantland, of the commission, to cite the power of Congress to levy taxes and to gather data through census reports, etc. The attention of the court also was called to the filing by steel producers during the war of detailed reports.

Four Distinct Processes

Attorney Wallace claimed that the commission was seeking to establish the authority of Congress to be informed of and regulate commerce and said that there are four distinct processes, including the assembling of raw materials, their manufacture into steel and

marketing the steel in intrastate and interstate commerce. He stressed the point that manufacturing does not constitute any part of commerce and that for this reason authority of Congress bearing upon the regulation of commerce does not have any bearing on the present case. It was stated that the assembling of raw materials by the carriers involves commerce so far as the railroads are concerned, but not as it relates to the producers.

Commission Has No Authority to Learn Costs

Attorney Wallace insisted that the commission is attempting to learn production processes and costs and maintained that it has no authority to do this. He had reference to paragraph 20 of the amended answer of the commission, when he said that it charges "that disalignment of steel prices with the prices of other commodities has seriously affected business and asserts that it is desired to 'ascertain the true facts and to disseminate such true facts.'" This, according to Attorney Wallace, indicated the inquisitorial power claimed by the commission.

"The entire steel industry, intrastate and interstate," said Mr. Wallace, "would become the subject of investigation. If based solely upon public interest, then the publicity concerning intrastate business would be equally as important as interstate. The commission would regulate by publicity; it would do indirectly through molded public opinion what the court inherently has not the power to do."

Attorney Cooke made arguments similar to those of his colleagues, with supplemental observations, in which he insisted emphatically that the commission does not have the authority to do what it is attempting.

The Census Cited

Attorney Adkins for the commission stated that the census requested statements which are as detailed as those called for by the questionnaire of the commission. He claimed that the power of the Government applied in this case and that Congress has the authority to learn the capacity and condition of certain plants, together with the other data that have been required. It was charged by Attorney Adkins that the attorneys for the producers are making every attempt possible to put obstacles in the way of the commission and to frustrate its legitimate purposes. He maintained that subpoenas requiring the commission to bring their books into court still are effective and said that if attorneys for the producers continue in their claim that officials of the manufacturers cannot be compelled to come to Washington for the hearing, he would ask that the case be assigned to a master and testimony be taken in the larger steel centers.

Attorney Chantland cited various legal authorities which he claimed applied in the present case, to prove that the commission has the right to get monthly cost reports from the steel producers and denied that its amended answer set up contradictory claims as compared with the original complaint. Instead he said that it only amplified citations in the original answer as to the authority of the commission.

While the point was not brought out in the arguments, it is known to be the attitude of the counsel for the steel producers that the commission really is attempting to fix prices by an indirect process, although it has no such authority even in the remotest sense.

During October the Mahoning Foundry Co., Youngstown, Ohio, shipped and sold more furnaces than in any other month in its history. The company is a substantial consumer of galvanized sheets.

OPPOSED TO REDUCTIONS

Attitude of Railroads as to General Action Stated at Hearing

WASHINGTON, Dec. 20.—Of outstanding importance, testimony presented before the Interstate Commerce Commission at its general rate investigation, the first part of which was concluded last Saturday, shows that the railroads are as strongly opposed as ever to general reductions in freight rates. Insistence of the iron and steel and other industries that a widespread leveling of transportation charges is essential to a recovery of business has not been accepted by the carriers as a sound policy to pursue. This attitude was reflected throughout the proceedings, which are to be resumed on Jan. 9, when the carriers will present supplemental statistics, after which the shippers will submit their side of the case. As yet the carriers have not prepared data required by the commission, some of which will deal with the relationship between prices paid for iron and steel and other materials at present as compared with those in effect on Aug. 31, 1920. Reply to statements brought out on this and associated subjects is expected to develop considerable interest because of claims made in railroad and other circles that despite the deflation in the iron and steel industry, prices still are out of alignment.

The hearing so far has not developed anything of a particularly illuminating character, unless it be the emphatic attitude of the carriers against a general reduction in rates, which they claim would not at this time increase business. The position of the railroads on this subject was exemplified by George M. Shriner, senior vice-president of the Baltimore & Ohio Railroad.

"The railroads of the United States are in no financial position at present to conduct experiments in reducing rates other than already contemplated, and to force such action on them at this time might result in an impairment of the transportation systems of the country to the hardship of the public," he said. "Lowered rates and reduced traffic have already resulted in the failure of the railroads to earn more than one-half of the 5½ per cent on their valuation contemplated under the transportation act, with nothing for the additional one-half per cent intended for railroad betterments."

Howard Elliott, chairman of the board of the Northern Pacific Railway Co., in opening the hearing, also explained the attitude of the railroads when he stated that "there is danger of giving too much weight to the freight rate itself and its effect on business. Reductions below the limit of adequacy may do the country more harm than good." He stated, however, that the railroads are anxious to co-operate in every reasonable way, through readjustment of rates, with agriculture, industry and labor so as to bring about better economic conditions. Like other witnesses, Mr. Elliott urged the commission to exercise the greatest speed consistent with the complete examination of the facts and conditions in conducting the hearings, so that a prompt decision may be reached. The present uncertainties, it was declared, and the "constant talk about reduced rates are having a very substantial influence in deterring business more than the rate itself."

Touching on deflation and the labor question, Mr. Elliott said:

"Manufacturing enterprises are also deflating and the same may be said about the jobbing and distributing business. What is called 'labor' has already been hurt by unemployment and by some reduction in wages, which, however, has not affected the great transportation interests to the extent that it should. A sound policy with the great labor leaders would seem to be to admit that deflation must come and allow lower wage scales on the railroads, in the mines and in the building trades, all of which would mean greater employment of men and a lower unit price on many articles that are used by all, this reducing the cost of living and helping to break the present endless chain of expense."

"Particularly would the recognition of such a policy be helpful to the railroads in their operations, because

of necessity, their direct labor bill is so great and because they are such heavy buyers of various raw materials where the labor cost is a very large part of the total."

While the railroads denoted their strong opposition to a general reduction of freight rates affecting all lines, it was announced by Alfred P. Thom, general counsel of the Association of Railway Executives, that it is the intention of the carriers to make a 10 per cent general reduction in rates on products of the range, farm, orchard and garden, effective Jan. 1. It also is reported that the carriers are prepared to make a reduction in rates on coal for export, in response to the pressure that has been brought to bear by coal operators and Government representatives, in order to meet British competition, which has almost destroyed American markets for bunkering coal and for the West Indies trade.

Secretary Weeks' Mobilization Plan

WASHINGTON, Dec. 20.—Mobilization of men, money and manufactories under a conscription law in the event of a future war as urged by Secretary of War Weeks, at the second annual reunion here last Saturday night of the War Industries Board, has aroused considerable interest. It is believed that the War Department is working out a plan reflecting the principles expressed by the Secretary, and that it may be submitted to Congress in the near future.

One of the underlying ideas is to hold down prices and wages by placing the producer and laboring interests under a stricter control than obtained during the World War. It is reported that the principles of the War Industries Board as they related to allocations, priorities and procurement orders, probably would be maintained, but that prices would not be fixed on a flat basis, but would be adjusted according to actual costs of given units of output, with only the slightest allowances over the cost of production being made.

Secretary Weeks stated that he would conscript every person in the United States from 18 to 60 years of age and compel every man to serve where he would be best suited. Such a plan of conscription, he pointed out, would "keep down prices during war, reduce profiteering, and prevent wages from reaching untold heights." He said that had such a course been followed in the past war, we would have avoided difficulties through which we are now going and with which we are not yet through.

Among those present at the reunion were Bernard M. Baruch, formerly chairman of the War Industries Board, and J. Leonard Reagle, who was head of the Iron and Steel Division.

Reduced Rates to the Coast

SEATTLE, Dec. 13.—Freight rate reductions on machinery from Chicago and Western territory effective Jan. 15 have been announced to buyers here by the traffic officials of the transcontinental lines. Present rates of \$2.95½ from Chicago to Puget Sound common points will fall to \$2.53. The reduced rate of \$1.20 on tin plate to Puget Sound common points from points north of the Ohio River will become effective Dec. 31. The reduction in minimum carload weight horse-drawn vehicles and motor vehicle freight bodies in carload lots from 30,000 to 20,000 lb. will be made effective Thursday.

The increased volume of business originating in the Wenatchee, Wash., fruit valley may cause the Great Northern Railway to lay a second track between Harrington and Wilson Creek, a distance of 35 miles, at an estimated cost of \$20,000 per mile.

The Dravo-Doyle Co., Pittsburgh, has been awarded the contract by the city of Cleveland for eight steam turbine driven centrifugal pumping units for installation at the new Fairmont pumping station. These units will be capable of pumping 300,000,000 gallons of water daily.

Government Aid in Machinery Exporting

What the New Division of the Bureau of Foreign and Domestic Commerce Is Prepared to Do to Help Manufacturers Sell Abroad

BY W. H. RASTALL*

In organizing the commodity divisions in the Bureau of Foreign and Domestic Commerce it was found that, according to the 1919 census, there are more than 4000 factories in the United States producing industrial machinery. The value of the products of these factories exceeds \$2,200,000,000 per year, of which huge total about 17 per cent, or nearly \$400,000,000, is exported. Obviously this is a very large business, but it is also a very important business because these 4000 plants have more than 400,000 employees whose income represents the livelihood of, say, 1,500,000 of our people, and the export business is of such volume as to represent the difference between profit and loss in the operation of many or most of these plants. It represents the difference between good times or depression, between a job and unemployment.

The Industrial Machinery Division was developed to defend and promote this trade, and there is every reason to believe that the volume of these foreign orders, this imported prosperity, can easily be increased to a very much larger total because the Bureau of Foreign and Domestic Commerce can do much more than has been done to assist the individual manufacturer to develop his foreign business. It will be noted that the above figures indicate an export business equal to about \$1,000 per employee. This figure should be doubled, and the application of American salesmanship and good business methods can do this.

The figures given above are obtained by combining the returns of the census and the customs, and there are differences in the classifications which are apparent in the details as published in the following table, but it is still felt that the general impression conveyed by these figures is substantially correct:

1919 Returns

	Plants	Production	Exports	Per Cent
Air compressors	57	\$57,454,000	\$3,761,200	6.5
Concrete mixers.....	62	9,579,000	246,631	2.6
Elevators and elevator machinery	195	54,052,000	2,601,543	4.8
Engines	371	464,770,000	48,370,483	10.4
Excavating machinery.....	34	6,641,000	1,165,763	17.5
Flour and grist mill machinery	86	16,366,000	2,375,802	14.5
Power laundry mach'y	30	10,341,000	796,053	7.7
Machine tools	403	212,225,000	22,627,477	
Metal working machinery (other than machine tools)	155	36,348,000	35,880,465	23.6
Meters, gas and water	39	*20,572,000	763,691	3.7
Mining machinery:				
Oil well	61	22,219,000	3,613,972	16.2
Other	124	43,028,000	9,265,319	21.5
Paper and pulp mill machinery	121	16,198,000	3,958,873	24.4
Printing presses	45	15,520,000	3,827,038	24.7
Pumps and pumping machinery	204	*65,360,000	9,067,458	13.9
Refrigerating mach'y	84	29,901,000	2,141,110	7.1
Railway cars	121	403,517,000	60,748,946	15.0
Road-making machinery	43	13,915,000	987,912	7.1
Shoe machinery	58	7,459,000	2,839,828	38.0
Sugar mill machinery	49	13,249,000	13,805,940	†
Textile machinery	431	126,006,000	14,986,389	11.9
Typeetting machines	92	24,531,000	3,932,544	16.0
Saw mill machinery	69	10,046,000	1,141,248	11.4
Other wood working machinery	172	19,536,000	2,603,407	13.3
Others	1,198	570,738,000	138,202,092	24.2
Total	4,304	\$2,269,571,000	\$389,711,154	17.2

*Includes value of all products of establishments engaged primarily in the manufacture of machines specified.

†Evidently a difference in classification (Editor).

Aims of the Industrial Machinery Division

This division has been instructed to give attention to industrial machinery. The kinds of equipment com-

*Chief, Industrial Machinery Division, Bureau of Foreign and Domestic Commerce.

ing within this classification are suggested by the items given in the above table, which may be more generally described as including every kind of machinery used in any kind of a factory, power plant or mine, or that runs on a railway, or is used in the construction of engineering enterprises.* The division has been placed in the hands of men who are qualified engineers and have sold a great variety of machinery in South America and Asia during a considerable number of years, and are personally familiar with conditions existing in many of the cities of those sections, in order that the division may be thoroughly practical in its work. These men are experienced exporters of American machinery and have faced world-wide competition in those foreign markets.

The division aims to be of the greatest possible service to American manufacturers and exporters of machinery and feels that the best way to accomplish this is to establish close contact with those interests, hoping thereby to learn as much as possible about their particular export problems, and the information manufacturers actually need regarding the various foreign markets. Having developed these problems it will be possible to secure help in their solution from the 600 representatives the Government maintains in foreign countries or, should circumstances justify, arrangements could be made to send special investigators into those fields and such tasks would be assigned to experts peculiarly qualified for the work. No problem is too large or too small for this service. Where practicable the division hopes to establish this contact with the manufacturers through committees appointed by their trade associations or in some similar way.

Services the Division Offers

In the various markets of the world different sales methods are employed in marketing machinery, and the experts of the division are familiar with these methods. Where it is wisest to sell through agents or dealers, they have reasonably complete lists of all available candidates in each of the important cities abroad and these can be passed on to interested manufacturers when desired. In those cases where it is practicable to visit Washington, it is possible also to furnish a great deal of additional information regarding these dealers which has been collected in the bureau from time to time, and with which manufacturers would be in position to concentrate their attention on those qualified to handle their special products.

Through the oversea representatives of our Government the division is constantly receiving word of new engineering enterprises and is notifying our manufacturers of the locations where business is developing. There is a good deal of this sort of information that is really important and ordinarily it is distributed to those firms that are listed in the bureau's "Exporters' Index," a compilation of those firms known to be American in their nationality. Manufacturers or exporters wishing to be placed on this index should communicate with the Industrial Machinery Division.

This division is also constantly making studies of the various foreign markets and export problems and these are published in Commerce Reports, the news-

*Agricultural and farm machinery, including tractors, etc., is handled by the Implements and Vehicles Division; automobiles and aircraft by the Automotive Division; electrical equipment by the Electrical Division; plumbing supplies by the Specialties Division, etc. When a given problem seems to be on the border line the two divisions co-operate cordially, the organization being sufficiently elastic to meet all requirements.

papers, or technical papers, as circumstances justify. An important number of these reports have been published recently, including information regarding the export of railway cars, locomotives, machine tools, German and British competition, etc. The division is also preparing a report on the machinery markets of Asia, which is the result of a special investigation that has involved a personal visit to every important city between Yokohama and Bombay, requiring about thirty months.

Other Divisions Can Assist

In cases where problems arise in connection with tariffs, foreign patents, trade marks, copyrights, agency agreements or other legal matters, a great deal of assistance can be furnished through the co-operation of the Commercial Laws Division and the Foreign Tariffs Division. In cases where disputes are involved, the bureau can frequently assist in the making of an adjustment and this co-operation has been found an important service in the past. In cases where the circumstances make it necessary, through co-operation with the Department of State, it will be possible to arrange to have the representatives of that department intervene to prevent discrimination and injustice.

The Industrial Machinery Division has just started to collect the laws and regulations of all foreign countries covering the inspection, construction and operation of steam boilers, air receivers and similar containers. In co-operation with the Electrical Division it plans to secure a similar collection of the electrical regulations of the whole world. These will be available for the use of American manufacturers and exporters of machinery, as circumstances show this is necessary. A general survey of the railway mileage and rolling stock of the world is in preparation, and an effort will be made

to have this indicate extensions in prospect during 1922 and, if possible, 1923. In co-operation with the Automotive Division a similar survey of the highways of the various countries of the world is being made, including such returns as will indicate the prospective market for automobiles and trucks as needed by that division, and the market for construction machinery, as needed by the Industrial Machinery Division. A similar survey of the steam, water power and other electric stations of the world is being prepared in co-operation with the Electrical Division, for similar purposes.

Additional Work Planned

The Industrial Machinery Division is new and there is a great deal of important work to do, but in making plans for this work the division wishes to have advice from manufacturers, in order to have the benefit of their contact with specific problems in the various foreign markets. The methods that have been established for collecting and distributing this information should prove of inestimable value to each of the above 4000 machinery manufacturers. The division wishes to handle these facilities in such a way that manufacturers secure actual sales in many widely distributed markets. The division will welcome advice and suggestions from interested manufacturers in preparing its plans. The division will make every effort to have the contact between the manufacturers and the markets abroad as direct and perfect as possible.

One such opportunity that will soon develop will be in connection with the Centennial Exposition to be held at Rio de Janeiro, Brazil, in September, 1922, which is to emphasize the possibilities of industrial development there, and in which a number of our manufacturers will undoubtedly wish to be represented.

TARIFF HEARINGS

Senate Committee on Finance Hopes to Complete Bill at an Early Date

WASHINGTON, Dec. 20.—The Senate Committee on Finance has almost completed hearings on the permanent tariff bill. While it is uncertain as to when it will have the actual rates and administrative provisions of the measure completed and the bill ready for introduction in the Senate, the committee proposes to complete the legislation as soon as possible.

It is conceded, however, that because it will be the object of prolonged debate by its proponents and opponents, several months at least likely will be required before the measure is finally passed. The outstanding object of discussion will be the proposed American valuation plan which has been both strongly supported and vigorously opposed. The committee is to form its conclusion on this principle of assessment with perhaps arrangements for a flexible tariff, as suggested by President Harding, after studying the report to be submitted on the American valuation plan by J. B. Reynolds, assistant to the Secretary of the Treasury in the Customs Division.

Senator Smoot, a member of the committee, has introduced four amendments to the tariff bill. One of them is designed to effectuate the principle of American valuation to be applied by executive order on recommendation by the Tariff Commission, and another would permit the President to modify ad valorem rates of duty by proclamation on account of depreciation of currency or other unstable conditions in the country of origin. A third amendment would apply the same principle to depreciation in exchange, while the fourth amendment would make it the duty of the President to ascertain differences in conditions of competition in trade in the United States and competing foreign countries, and authorize certain courses of action in such circumstances. It seems to be a foregone conclusion that the American valuation plan will be adopted by the committee "in principle" at least, despite the propaganda that has been instituted against it.

Apparently it is the intention of the committee to modify the plan as proposed by the House, but without making such a change as to cause its rejection by that branch of Congress. Leading Republican members of the House Committee on Ways and Means have stated flatly that they will not, under any circumstances, forego the principle of American valuation.

The attitude of manufacturing interests toward the American valuation plan is emphasized by the result of the vote on the subject growing out of the questionnaire for and against the plan, issued by the National Association of Manufacturers. Of the ballots received on this referendum, 77.7 per cent voted in favor of the principle of American valuation and 20.7 per cent voted against it. Defective ballots amounted to 1.6 per cent, which accounts for the remainder.

Prominent members of the Committee on Finance have indicated that the adoption of a principle embodying the American valuation plan will mean the lowering generally of rates carried in the tariff bill as passed by the House. With regard to the steel schedule, however, it has been admitted that the requests made by independent producers for rates have been moderate. This has given the inference that there will not be a general and sharp lowering of rates in the steel schedule as a whole. Modifications, of course, are expected and were urged by steel producers both as they relate to certain increases and decreases of rates. The steel producers are hoping that there will be decided changes in the ferroalloy section. They have asked the committee to lower the rates greatly in some instances, and to remove them entirely in others, particularly those relating to manganese ore and ferromanganese. Domestic manufacturers of ferroalloys have earnestly requested the commission to establish protective rates and have asserted that unless they are granted they will be put out of business by foreign competition.

Effective from Dec. 15 to 31, clerical employees of the Erie Railroad except those in the traffic department, are on a half-time basis in the Ohio region, according to announcement by W. A. Baldwin, regional manager. The action follows slackening business.

Open Price Associations Declared Illegal

United States Supreme Court Renders Decision in Hardwood Case, Holding That Competitors Who Exchange Information Violate Law

WASHINGTON, Dec. 20.—Interpreted as uprooting practically all of the fundamental principles of trade association activities which aim in any way to affect prices, a majority opinion of the United States Supreme Court was delivered yesterday by Justice Clarke in the so-called open price competition plan of the American Hardwood Manufacturers' Association. By a divided opinion of six to three, the highest tribunal affirmed the decision of the lower courts, holding that competitors who exchange information as to past transactions, and touching prices or production, are doing that which is prohibited by the Sherman anti-trust law. So sweeping is the decision, in the estimation of attorneys who have closely followed the case, that it will force the dissolution of many trade associations in every branch of industry, and may develop a widespread change in methods of doing business.

Doubt exists as to the complete effect of the decision because Justice Clarke contented himself with reading only a few excerpts. The majority opinion was not made available, as is the ordinary custom, inasmuch as it was necessary for Justice Clarke to make numerous minor revisions and amplifications.

Effect on Department Activities

While the decision is a distinct victory for the Department of Justice, which prosecuted the case, and a sharp blow to trade associations throughout the country, it raises the question whether it will be possible for the Department of Commerce in particular to assist the various industries in the gathering and compilation of data such as those collected by hardwood manufacturers. By some it is believed the decision will stop further cooperation, including that contemplated between this Federal agency and manufacturers in all of the leading lines.

The case for the first time presented legal question as to the practices of those organizations in industry which are known as "open price associations." The court upheld the contention of the Government that this plan was invented and adopted by the industrial world to circumvent the provisions of the Sherman anti-trust act as to co-operation and exchange of information in trade. The Government insisted that the operation of the plan is far more efficacious in controlling prices than an actual price-fixing agreement between the same persons. Justice Clarke held that the plan "constituted a joint conspiracy to restrict lumber production in the country and keep prices up." He declared that the arrangement was nothing more than calling an old scheme by a new name. According to the opinion there was no evidence presented showing the existence of a "gentlemen's agreement," but the result was "a harmonious individual action among large groups of natural competitors."

Declared a Combination

Justice Clarke said that while the plan to all appearances on paper provided for data on past performances, or transactions which it was claimed could not be used in fixing prices, the detailed discussion and predictions in the trade, coupled with the analysis by statistical experts, indicated to the court that the plan was a combination which primarily had a tendency to restrict production, and consequently it was a concerted effort to increase prices. It was the contention of Jus-

tice Clarke that detailed argument of the purposes of the plan was not necessary because the effect of the combination could be easily ascertained in the market columns of daily newspapers and Government publications. Considerable stress was placed upon the employment of an expert statistician by the hardwood organization as an assistant to the secretary, which the court described as "an authoritative voice of the organization."

Attorney General's Statement

It is a source of speculation as to whether the Government will proceed against other trade associations in other industries unless they either voluntarily dissolve or restrict their activities. This point arises from the statement of the Attorney General in the supplemental brief filed in the Hardwood Case in October, in which it was said:

"Manifestly, the results of the co-operation of this open price scheme are different when applied to different industries, and under different economic conditions. This court will become fully informed as to its various effects unless the disposition of this case be such as to render future actions of this character useless. By considering the motives which control human conduct, we can reach a reasonably correct conclusion as to what some of the results have been, and will be, if the activities of these associations are not restrained, under the varying conditions incident to the industries and the commerce of this country."

That the only alternative for the continuation of trade association work such as that carried on by the hardwood producers lies in legislative action is the opinion of L. C. Boyle of Washington, general counsel for the American Hardwood Manufacturers' Association. In his opinion the decision makes it absolutely impossible for industrial groups to study their economic problems, and as a consequence "it is a stranglehold upon progress." Attorney Boyle said he probably would ask for a rehearing of the case, but admits that motions of this kind are very rarely granted.

The Government's bill in this case was devoted almost exclusively to the distribution of information through market letters and the acquiring of trade data by means of questionnaires. In the opinion of Justice Clarke, the market letters were not the controlling influence, but the plan whereby statistics were exchanged as to past transactions.

Weekly Market Letters

The market letters of which the Government complained were sent to the membership weekly and as prepared by the manager discussed various subjects of interest to the trade. The Government insisted that they were devoted principally to conditions affecting production and other elements which control prices. The questionnaires which were sent out were declared by the court to have much to do with future sales and production. In connection with the employment of statistical experts to analyze market conditions from actual data gathered from the membership, the court upheld the contention of the Government that "it is the exchange of information as to real facts that is most effective; and not expressions of intentions, or even agreements as to what the parties concerned will do."

The decision in upholding this and other basic

points made by the Government is so broad that, in the opinion of Attorney Boyle, "it will destroy every industrial association in America, because all of them are doing things which come within the purview of the decision." In brief, it is maintained, the court took the position that industries in competition should not tell each other of their affairs.

This decision is the outcome of an appeal from the Federal District Court for the Western District of Tennessee, where the case is known as the American Column & Lumber Co. et al. vs the United States. In affirming the action of the lower courts, the Supreme Court sustained the permanent injunction which restrained 329 hardwood manufacturers from compiling, exchanging and discussing prices, production, stocks, and market conditions.

Dissenting Opinions

Justice Brandeis and Justice Holmes delivered carefully written dissenting opinions. These were forceful and developed the situation as contended by the industry. Justice Brandeis's opinion was exhaustive. Justice McKenna joined Justice Brandeis and Justice Holmes in the dissent.

Delivering the dissenting opinion, Justice Brandeis pointed out that "It may be that the distribution of trade data, editorial comment, and conferences enabled the producers to obtain on the average higher prices than would otherwise have been possible. But there is nothing in the Sherman law to indicate that Congress intended to condemn co-operative action in the exchange of information merely because prophecy resulting from comment on the data collected may lead, for a period, to higher market prices." He declared that the plan had a tendency to promote desirable competition "by substituting knowledge for ignorance, rumor, guess and suspicion. It tends also to substitute research for gambling and piracy, closing the door to adventure or lessening the value of prophetic wisdom. In making such knowledge available to the smallest concerns, it creates among producers equality of opportunity, making it available also to the purchasers and general public. It does all that can actually be done to protect the community from extortion." Furthermore, Justice Brandeis said: "The refusal to permit a multitude of small rivals to co-operate as they have done here in order to protect themselves and the public from the chaos and havoc wrought in their trade by ignorance, may result in suppressing competition in the hardwood industry. Keen business rivals, who sought through co-operative exchange trade information to create conditions under which alone rivalry and competition is possible, produced in the aggregate about one-third of the hardwood lumber of the country." Justice Brandeis directed attention to the decision of the court in the Steel Corporation case, in which it was held "that it was not unlawful to invest in a single corporation control of 50 per cent of the steel industry of the country, and in the United Shoe Machinery case, where the court held it was not unlawful to vest in a single corporation control of practically the whole shoe machinery industry." Justice Brandeis fears that the decree will lead to consolidation and centralized control of industries.

Justice Holmes' Dissent

Justice Holmes pointed out that a combination to get and distribute such knowledge, notwithstanding its tendency to equalize, not necessarily to raise prices, is very far from a combination in unreasonable restraint of trade. It is true that it is a combination of sellers and owners, but the knowledge acquired is not secret—it is public to the buyers, who are not less active in their efforts to know the facts. Justice Holmes stated that he saw nothing in the conduct of the appellants

that binds the members, even by merely social sanctions, to anything that would not be practiced by an all-wise socialistic government acting for the benefit of the community as a whole. The parties to the combination are free to do as they will.

It is significant to note that Justice Holmes considers the decree as it stands an amazing thing in a country of free speech that affects to regard education and knowledge as desirable. In his opinion it prohibits the distribution of stock production or sales efforts, the discussion of prices, as at social meetings, and the exchange of predictions of high prices. Furthermore, he does not believe that the decree should be so drastic as to exclude operators in the backwoods from obtaining information as to market conditions. He agreed to the most elaborate discussion by Justice Brandeis.

Ground to Be Broken for Cold-Rolled Strip Mill at Beacon, N. Y.

Ground will be broken at Beacon, N. Y., the first week in January for the cold-rolled strip mill of the Hudson City Steel Corporation, the plans of which were published in THE IRON AGE of Aug. 19, 1920. It will roll strips from 2 to 14 in. wide and from 0.01 to $\frac{1}{4}$ in. thick and will sell to the general trade. The corporation owns another site at Hudson, N. Y. It is the plan to first manufacture strips, later building open-hearth furnaces, thereby making it unnecessary to buy billets and sheet bars.

The mill will have a cold-rolled strip capacity of 1000 tons per month on a 10-hr. day. The equipment will consist of five 10-in. mills, five 12-in. mills, two 25-ton General Electric annealing furnaces, two slitters and two straighteners. Dwight P. Robinson, Inc., New York, will erect the building and install the equipment. Offices of the Hudson corporation are at 2302-4 Woolworth Building, New York, in charge of James S. Landers, vice-president and general manager. The corporation was formed in May, 1920, the capitalization being \$500,000.

Forge Plant of Standard Parts Co. Sold

The Canton, Ohio, forge plant of the Standard Parts Co., Cleveland, has been sold by Frank A. Scott, receiver, to Fred A. Poor and Phillip Moore, president and vice-president, respectively, of the P. & M. Co., Chicago. The purchase price was \$293,500. The purchasers will organize a new company to continue the operation of the plant. The sale has been approved by the Federal Court. The equipment of the American Ball Bearing plant, Cleveland, of the Standard Parts Co., will be sold at public auction between Jan. 15 and Jan. 30. This plant has been used by the Standard Parts Co. as an axle plant and some of its machinery equipment has already been sold at private sale. The policy of the receiver is to dispose of some of the smaller plants of the Standard Parts Co. and concentrate activities in the larger plants.

COMING MEETINGS

December

American Association for Labor Legislation. Dec. 27, 28 and 29. Annual meeting, William Penn Hotel, Pittsburgh. Secretary, Dr. John B. Andrews, 131 East Twenty-third Street, New York.

January

American Engineering Council. Jan. 5 and 6. Meeting at Cosmos Club, Washington. Secretary, L. W. Wallace, Washington.

February

American Institute of Mining and Metallurgical Engineers. Feb. 20-25. Spring meeting, Engineering Societies Building, New York. Secretary, Frederick F. Sharpless, 29 West Thirty-ninth Street, New York.

INQUIRY FOR COKE

Warren and Pittsburgh Companies in the Market —Reports as to Sheets Investigated

YOUNGSTOWN, Dec. 20.—Iron and steel activity in the Mahoning Valley is on a declining basis and operations are proportionately receding. Just what the first quarter of 1922 holds in store for the industry is a matter of some speculation, though the general impression is that the average will show betterment. A leading Valley executive doubts, however, whether gross business in the first three months of next year will equal that of the final quarter in 1921, owing to the favorable showing made in October and November. A Valley interest is rolling merchant plate for the first time in several months, though such capacity has been engaged for about ten weeks in producing plate for larger sizes of steel pipe.

In addition to the coke inquiry put forth by the Trumbull-Cliffs Furnace Co., Warren, the A. M. Byers Co., Pittsburgh, is seeking 15,000 tons for its Mattie blast furnace at Girard, Trumbull county, delivery to commence Feb. 1. The company seeks prices on deliveries covering three months, and also on five months. Its present coke contract with the Youngstown Sheet & Tube Co. expires Feb. 1 and it is not improbable that it may be extended. That by-product coke may be purchased on contract for forward delivery at \$3.25 per ton is the belief of several interests here.

The sheet market is quiescent and current buying has been reduced to a low scale. In face of this decline, attributed to year-end slowup, producers in the Valley are endeavoring to hold prices firm at current levels of 2.25c. for No. 10 gage blue annealed, 3c. for No. 28 gage black and 4c. for No. 28 gage galvanized. In pursuance of its intention to hold the market, if possible, to these base quotations, a large interest is taking the trouble to investigate all reports submitted by buyers of price concessions. These investigations are made promptly by telegraph and long distance telephone. Among makers generally there is therefore a tendency to observe these quotations, though it would not be surprising, in view of the absence of business and keen competitive conditions, if some tonnage should be booked at concession figures.

The little sheet business trickling through is mainly for small lots of common and galvanized grades.

Basic Pig Is Less Firm

Basic pig iron is less firm at \$19 than it has been and \$18.75 could probably be done on an attractive tonnage. This price is reported to have been accepted by the maker on a recent iron transaction through a brokerage interest, the buyer, however, paying \$19. Some foundry business for first quarter delivery is being taken in this territory. Since the period of enlarged production beginning in August, substantial inroads have been made into accumulated iron stocks held by steelworks makers. An interest which has been operating its single blast furnace since July 1, however, has accumulated about 10,000 tons of iron, representing the excess output above the requirements of its steel-making departments.

Among the secondary plants in the Youngstown district, car repair interests present the most active schedules and a number are booked well into the first quarter. The latest order to be placed in this territory calls for the repair of 250 freight cars, placed by the New York Central Railroad with the Petroleum Iron Works. It represents heavy repairs to open top cars. The Standard Tank Car Co., Sharon, Pa., is working off an order for the repair of 300 freight cars, emanating from the same source.

Range on plate prices is from 1.50c. to 1.65c., though reports of business below the minimum figure are heard here. District interests maintain they can make no profit on such business at 1.50c. or less.

Lower full finished sheet demand reflects lessened automobile production and substantial decline in requirements from this source. The principal independent maker of full finished will ship from stock during the next few weeks, while its rolling equipment is being overhauled preparatory for a steady run in 1922.

No. 22 gage automobile body stock is still quotable at 4.35c per lb.

Strip steel is considerably weaker, and going prices are 2c. for hot rolled and 3.75c. for cold rolled, in comparison with quotations of certain makers averaging \$5 per ton higher.

Open-hearth sheet bars have dropped a peg and are now obtainable under contract at \$29, though some unattractive business would probably command \$30.

Stevens Institute Celebrates Its 50th Anniversary

Stevens Institute alumni and their friends joined in a 50th anniversary celebration at a notable dinner at Hotel Astor, New York, Thursday evening, Dec. 15. Among the 400 in attendance were a number of engineers who have won national distinction. At each guest's place was a brochure, well illustrated, recounting the 50 years of progress and service in the life of the Hoboken institution founded by Edwin A. Stevens and fostered by the members of his family. Stevens has had but two presidents, Henry Morton serving until 1902 and Alexander C. Humphreys immediately following him. The story of 50 years tells of the gifts made to Stevens in more recent years, including \$125,000 from Andrew Carnegie and alumni subscriptions of \$507,000.

A noteworthy feature of the dinner was the presence of the entire class of 1877. The 10 men who graduated in that year were applauded roundly as they answered to the call of the roll. They are named below:

A. G. Brinckerhoff, secretary Nash Engineering Co., South Norwalk, Conn.
M. I. Coster, vice-president Westinghouse Electric International Co., New York.
W. E. Geyer, Boonton, N. J.
F. E. Idell, mechanical engineer, 50 Church Street, New York.
L. H. Nash, president Nash Engineering Co., South Norwalk, Conn.
J. B. Pierce, Mercer County, Pa.
J. Rapelje, Hopewell Junction, N. Y.
E. P. Roberts, special consultant and manager Engineering Society of Akron, Akron, Ohio.
E. A. Uehling, president Uehling Instrument Co., Passaic, N. J.
F. VanWinkle, consulting engineer and associate editor *Power*, New York.

President Humphreys, in an address emphasizing some of the things for which Stevens Institute stands, challenged a statement made at a recent joint conference of the American Society of Mechanical Engineers and the American Society for the Promotion of Engineering Education. One of the speakers at that conference, a university professor, stated that colleges to-day are aiming at "quantity production" rather than quality of product. This speaker quoted the secretary of the second named society, who is dean of the engineering school of a university, to the effect that "there is no first-class engineering school in America." President Humphreys suggested that the pessimistic opinions of these professors may be attributable in part to the observed results of faulty teaching. To the charge of quantity production the speaker held that Stevens Institute is well justified in pleading not guilty. While there are no perfect institutions, "when we speak of 'first class,' that is relative, and so speaking I disagree with these men and claim there are a number of first class engineering schools in America, of which Stevens is one."

"These men, as do too many educators, as I have often had occasion to observe, seem to forget or fail to recognize that education does not end with the school and college. All graduates still have ahead of them the post-graduate training to be had only in the exacting school of experience. The school and college by themselves cannot produce practically qualified engineers."

Other speakers were Dr. John H. Finley and Hon. Job E. Hedges. A pleasant incident of the evening was the recognition given to Prof. Charles Frederick Kroeh, who for 50 years, or from the beginning, has occupied the chair of languages at Stevens and is still carrying his full duties. A feature of the testimonial was the presentation of a loving cup by the alumni.

Iron and Steel Markets

LESSENED SHIPMENTS

Mill Operations Slightly Reduced

Rail Buying Conservative—Structural Work of Good Volume—Pig Iron Lower

Producers of steel are not concerned over the recent slackening in demand. They look on it rather as a promise of renewed buying early in the new year, seeing that stocks have been drawn down to a low point, following the replenishment movement of the fall months.

At the same time it is recognized that next to the unsettled question of freight rates, uncertainty as to prices is the chief influence now working on consumers of steel, insuring a continued policy of careful buying.

With the shrinkage in new business has come some letting down in mill shipments. In addition to the inventory reason, some buyers are asking the holding up of shipments until after Jan. 1, awaiting the taking off of the war tax on freight charges.

In the Pittsburgh and nearby districts independent plants are now running at about 35 per cent of capacity while the Steel Corporation's percentage is close to 45. At Chicago the Illinois Steel Co.'s output is slightly reduced, being now at 43 per cent.

Railroads are proceeding conservatively in placing rails. The Pennsylvania Railroad, which had considered 150,000 tons for 1922, is inquiring for 100,000 tons. The Rock Island, which still has 13,000 tons unshipped on its 1921 quota, will probably take 30,000 to 40,000 tons for next year. The Chicago & Northwestern order is expected to be 10,000 tons.

More car repair work is pending and the outlook is fair for new car orders, but in general the railroad programs are not as definite as had been hoped. Announcements by the Illinois Central and other western lines are looked for in January.

Following recent low dips in line pipe prices on some of the large contracts recently reported, the Steel Corporation made a reduction of \$5 per ton in standard and oil country pipe and of \$6 on line pipe, effective Dec. 15. In other respects the price situation is not definitely changed. The wire market is under observation in view of recent irregularities and buyers look for developments early in the new year.

The Humble Oil Co. contract, the latest in an unusual run of tank orders, represents 2700 tons of plates. The oil tanks for the Mexia, Texas, field alone will require 60,000 to 75,000 tons of steel and altogether the tank shops have saved the situation for the plate mills in the flatness of shipyard work.

Fabricated steel projects show no letting up. Fresh proposals involve 35,000 tons, several large buildings included, and the whole averaging 2500 tons. About 8000 tons of awards is noted. In the face of maintained building activity, the quest for plain material tonnage is yet so keen that bidders figure on every advantage of the fabricating-in-transit privilege, so that a mill situated to favor a

fabriicator can thus deliver at a minimum price to the erector.

November slightly bettered the October total of bridge and building awards, at nearly 100,000 tons. Both months exceeded any others in 1921.

Further weakness has developed in leading pig iron markets. In the South a sale of 1000 tons has been made to a sanitary company at \$17, Birmingham; but \$17.50 is still generally quoted. At Pittsburgh basic iron has declined 75c. on a sale of 2500 tons, and foundry has been marked down by 50c. to \$1. Chicago prices on foundry, malleable and basic irons are down about 50c., while in Philadelphia on a sale of 5000 tons of basic the market declined 75c. and foundry iron has also declined about 50c. The general disposition of buyers is to stay out of the market until after the holidays.

The week's developments indicate progress on the plan for a three-company Youngstown-Chicago district consolidation. The larger merger may take considerably more time. Several new projects are afoot.

Pittsburgh

PITTSBURGH, Dec. 20.

The past week not only has seen a further shrinkage in business but also in shipments. In addition to the inventory reason for not wanting to take in much material, buyers also are asking for the holding up of shipments until after Jan. 1, to escape the war tax on freight, which ceases Dec. 31. Steel plant activities naturally reflect the smaller volume of business and deliveries. Steel Corporation plants in the district show no appreciable decline in the number of active units, but since they are not being forced there has been some decline in production. Practically all of the independents in this and nearby districts have put off some capacity since a week ago, and we now estimate their operations at about 35 per cent of steel making capacity, which compares with about 45 per cent by the Steel Corporation plants. The market does not reflect a great deal of interest on the part of buyers in their early 1922 requirements.

Price changes have not been numerous in the past week. Real firmness is apparent in sheets, which are holding rigidly to the bases announced by the American Sheet & Tin Plate Co. as of Nov. 25. Reports are common about concessions from these prices, but substantiation is lacking. The tin plate market seems to have firmed up again after a brief period during which some makers took business at below the regular quotation of \$4.75. Suggestions that less than 1.50c., Pittsburgh, can be done on plates, shapes and bars are heard, but in a general way that price is minimum and the counter claim is made that only on good sized tonnages will the mills go even to that figure. Considerable uncertainty exists in the market for wire products, due to the fact that some mills outside the Pittsburgh district lately have been accepting business on a mill rather than a Pittsburgh base.

The most important change in prices in the week was a reduction by the National Tube Co. of \$5 per ton in standard and oil country pipe, and of \$6 per ton in line pipe, this reduction being effective Dec. 15. Independent makers met this change but there has been no change in the discounts on wrought iron pipe, which still is being sold on a card dated Sept. 1.

The pig iron market has been enlivened by one good sized purchase of foundry iron by a sanitary

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Dec. 20.	Dec. 13.	Nov. 22.	Dec. 21.	Sheets, Nails and Wire	Dec. 20.	Dec. 13.	Nov. 22.	Dec. 21.
	1921	1921	1921	1920	Per Lb. to Large Buyers:	1921	1921	1921	1920
No. 2X, Philadelphia†	\$21.34	\$22.26	\$22.84	\$34.79	Sheets, black, No. 28, P'gh	3.00	3.00	2.75	4.35
No. 2, Valley furnace†	19.50	20.50	20.50	35.00	Sheets, galv., No. 28, P'gh	4.00	4.00	3.75	5.70
No. 2 Southern, Cin'tif.	21.50	22.00	22.50	42.50	Sheets, blue an'l'd, 9 & 10	2.25	2.25	2.25	3.55
No. 2, Birmingham, Ala.†	17.50	17.50	18.00	38.00	Wire nails, Pittsburgh	2.75	2.75	2.75	3.25
No. 2 foundry, Chicago*	19.50	20.00	20.00	34.00	Plain wire, Pittsburgh	2.50	2.50	2.50	3.25
Basic, del'd, eastern Pa.	20.25	21.00	21.00	33.86	Barbed wire, galv., P'gh.	3.40	3.40	3.55	4.10
Basic, Valley furnace	18.25	19.00	19.00	33.00	Tin plate, 100-lb. box, P'gh.	\$4.75	\$4.65	\$4.75	\$7.00
Bessemer, Pittsburgh	21.96	21.96	21.96	36.96					
Malleable, Chicago*	19.50	20.00	20.00	34.50					
Malleable, Valley	20.00	20.00	20.00	35.00					
Gray forge, Pittsburgh	20.96	21.46	21.46	35.96					
L. S. charcoal, Chicago	31.50	31.50	31.50	43.50					
Ferromanganese, del'd.	60.00	60.00	60.00	110.00					
Rails, Billets, etc., Per Gross Ton:									
O-h. rails, heavy, at mill	\$40.00	\$40.00	\$40.00	\$47.00					
Bess. billets, Pittsburgh	29.00	29.00	29.00	43.50					
O-h. billets, Pittsburgh	29.00	29.00	29.00	43.50					
O-h. sheet bars, P'gh.	30.00	30.00	30.00	47.00					
Forging billets, base, P'gh	32.00	32.00	32.00	51.00					
O-h. billets, Phila.	33.74	34.74	34.74	49.24					
Wire rods, Pittsburgh	38.00	38.00	40.00	57.00					
Skelp, gr. steel, P'gh.	1.50	1.50	1.60	2.65					
Light rails at mill	1.55	1.55	1.55	3.00					
Finished Iron and Steel									
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents					
Iron bars, Philadelphia	1.85	1.95	1.95	3.85					
Iron bars, Chicago	1.60	1.65	1.65	3.25					
Steel bars, Pittsburgh	1.50	1.50	1.50	2.35					
Steel bars, Chicago	1.60	1.60	1.60	2.73					
Steel bars, New York	1.88	1.88	1.80	2.73					
Tank plates, Pittsburgh	1.50	1.50	1.50	2.65					
Tank plates, Chicago	1.60	1.60	1.60	3.03					
Tank plates, New York	1.83	1.83	1.88	3.03					
Beams, Pittsburgh	1.50	1.50	1.50	2.45					
Beams, Chicago	1.60	1.65	1.60	2.83					
Beams, New York	1.88	1.88	1.88	2.83					
Steel hoops, Pittsburgh	2.00	2.00	2.00	3.05					

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Dec. 20, 1921, Finished Steel, 2.098c. Per Lb.

Based on prices of steel bars,
beams, tank plates, plain wire,
open-hearth rails, black pipe
and black sheets

These products constitute 88 per cent of the
United States output of finished steel.

{	Dec. 13, 1921.	2.135c.
	Nov. 22, 1921.	2.099c.
	Dec. 21, 1920.	3.082c.
	10-year pre-war average.	1.684c.

Composite Price, Dec. 20, 1921, Pig Iron, \$18.85 Per Gross Ton

Based on average of basic and foundry
irons, the basic being Valley quotation,
the foundry an average of Chicago,
Philadelphia and Birmingham

{	Dec. 13, 1921.	\$19.46
	Nov. 22, 1921.	19.64
	Dec. 21, 1920.	34.30
	10-year pre-war average.	15.72

ware manufacturer and also by a purchase by a Valley steel maker of 2500 tons of basic, both transactions developing lower prices than recently had prevailed. In the case of the foundry iron, there was a decline of from 50c. to \$1 per ton from recent quotations, while the sale of basic iron was at a decline of 75c. per ton from last week's base.

The scrap market shows less activity, but the effect of recent buying by some of the Steel Corporation subsidiaries, as well as by a large independent, still is seen in prices. Fuel market activities are restricted and with no indications of the early blowing in of any of the idle merchant furnaces, negotiations for first quarter tonnages at the price named by producers are not progressing very rapidly.

Pig Iron.—A sanitary ware manufacturer in the past week closed for slightly more than 2000 tons of foundry iron for early delivery, on which a price as low as \$19.50, Valley furnace, was developed on iron of 1.75 to 2.25 silicon content, as compared with \$20.50, the recent minimum of Valley furnaces on this grade. Small sales of this grade have been made at \$20, and the quotable market is \$19.50 on sizable lots, and \$20 for the less pretentious tonnages. After frequent intimations that less than \$19 Valley furnace could be done on basic

grade, there has been a sale in the past week confirming such statements. A Valley steel maker has closed for 2500 tons of this grade for prompt delivery at \$18.25, the iron to be shipped from another steel works. There is a possibility that less than \$20 could be done on Bessemer iron on a sizable order, but that price could not be shaded against such inquiries as are coming out, which usually are for carload lots. Some of the foundries are beginning to sound out the market against first quarter tonnages, but so far no business has developed.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being \$1.96 per gross ton:

Basic	\$18.25
Bessemer	20.00
Gray forge	\$19.00 to 19.50
No. 2 foundry	19.50 to 20.00
No. 3 foundry	19.00 to 19.50
Malleable	20.00

Ferroalloys.—Recent increase in the inquiries for 50 per cent ferrosilicon have served to bring out lower prices than makers hitherto have been quoting. A West Virginia steel maker has closed for a carload of this material at approximately \$55 per ton delivered, this price having been named by one American maker and a Canadian producer, the business going to the former. It is believed that this price could be done on

additional tonnages, although the asking or negotiating price of most producers is \$60 furnace, freight allowed. Moderate sized inquiries for ferromanganese are reported, but with steel works operations slowing down, few consumers are urgently in need of supplies, and the inquiries are believed to be for material wanted after the turn of the year. No sales of importance lately have been made in this district. Domestic and British makers continue to quote \$58.35 c.i.f. Atlantic seaboard on 80 per cent material, while German ferromanganese is quoted at \$54. It is reported here, however, that some recent business in the latter in the East was done at a price of \$52.25 seaboard. The market on spiegeleisen remains extremely dull, but stocks, notably of 20 per cent material, are pretty low and there is no disposition on the part of makers to cut prices to secure orders.

We quote 78 to 82 per cent domestic ferromanganese at \$60 to \$63.67 delivered; 78 to 82 per cent foreign ferromanganese, \$58.35, c.i.f. Atlantic seaboard; German, \$54, seaboard. Average 20 per cent spiegeleisen at \$30 delivered, Pittsburgh or Valleys; 50 per cent ferrosilicon, domestic, \$55 to \$60, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, \$38.50; 11 per cent, \$41.80; 12 per cent, \$45.10; 13 per cent, \$49.10; 14 per cent, \$54.10; silvery iron, 6 per cent, \$27; 7 per cent, \$28; 8 per cent, \$29.50; 9 per cent, \$31.50; 10 per cent, \$33.50; 11 per cent, \$36; 12 per cent, \$38.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is \$4.06 per gross ton.

Billets, Sheet Bars and Slabs.—The market is dull and nominal. There is practically no interest in billets and slabs, and inquiries for sheet bars are small and scattering, because of the light order books of sheet makers who buy their sheet bars. Only an appraisal of price possibilities can be given. Makers quite generally are quoting \$30 for 4-in. billets, and for slabs and sheet bars, but on billets and slabs these prices are so much out of line with those for the finished products that it is more than probable they would be shaded against sizable orders. It is known that billets can be bought at \$29 and sales are reported of sheet bars at \$29.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at \$28 to \$30; 2 x 2 in. billets, \$30; Bessemer and open-hearth sheet bars, \$30; slabs, \$30; forging billets, ordinary carbons, \$32 to \$35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—Prices remain easy in the lack of important demands. The asking price on common soft rods is \$38 base, but slightly less is known to have been done by some makers who wanted some tonnage to round out a rolling schedule. Screw stock rods are fairly well sustained at \$43, but on carbon rods there has been some modification of the premium over soft rods, more of the lower carbon content having been sold at \$45 recently, against a recent minimum of \$46. Prices are given on page 1638.

Steel Skelp.—The market here is holding rather well on a basis of 1.50c. on steel pipe stock. Not much business is coming out, but makers here and nearby still are working on a good-sized order placed a short time ago for Western shipment.

Structural Material.—Some of the local shops have had a fair run of orders in the past week, but none of them involve work in this immediate district. The American Bridge Co. will fabricate 2200 tons of steel for the new South Street bridge over the Schuylkill River, Philadelphia, the general contract for which recently was awarded to the Dravo Contracting Co., Pittsburgh. The McClintic-Marshall Co. has taken 27 plate girder bridges for the Interstate Railroad Co., Norton, Va., requiring 1800 tons, Public School No. 187, Brooklyn, for which 800 tons will be needed, a storehouse for the Navy Department, Pearl Harbor, Hawaii, taking 500 tons, a building for Joseph Bancroft & Sons Co., Wilmington, Del., taking 265 tons, and a building for the Knickerbocker Ice Co., New York, taking 100 tons. In this district structural work is seasonably quiet and not much improvement is looked for until after the turn of the year. Plain material is only moderately active, but recent prices appear to be well maintained. Prices are given on page 1638.

Steel Rails.—Business in light sections is seasonably small and as users appear to be well covered against their immediate requirements, makers realize the futility of trying to force sales. The result is that the mar-

ket is slightly steadier within the same range of prices as a week ago.

We quote 25 to 45-lb. sections, rolled from new steel, 1.55c. to 1.60c. base; rolled from old rails, 1.50c. base; standard sections, \$40 per gross ton mill for Bessemer and open-hearth sections.

Plates.—While a number of oil storage tank inquiries are pending, there has been no important business of this character in the past week, and the plate market consequently is somewhat quieter than it was recently. Possibly less than 1.50c., Pittsburgh, might be done on an order of some size, but makers in this immediate district disclaim having shaded that price.

We quote sheared plates, $\frac{1}{4}$ in. and heavier, tank quality, at 1.50c. to 1.60c. f.o.b. Pittsburgh.

Iron and Steel Bars.—The market is even duller than it has been, but, if anything, there seems to be less pressure to sell and prices are somewhat steadier than they have been. On soft steel bars, makers in this and nearby districts are disinclined to consider less than 1.50c., Pittsburgh, although it is well understood that in competitive territory less than this price would have to be done to secure orders. Iron bars are slow of sale, but makers are not shading quotations, because they do not believe that this would result in orders.

We quote steel bars rolled from billets at 1.50c.; reinforcing bars, rolled from billets, 1.45c. to 1.50c. base; reinforcing bars, rolled from old rails, 1.40c. to 1.45c.; refined iron bars, 2c. to 2.10c. in carloads, f.o.b. mill, Pittsburgh.

Wire Products.—Business has fallen to very slim proportions in the past week, not only because of the desire on the part of buyers to avoid large stocks for the year end, but because of the development of fresh price uncertainties, which have made for caution until the situation becomes more settled. Makers in this district are still quoting nails at \$2.75 base, per keg, and plain wire at \$2.50 base per 100-lb., but admit losing business at these prices. Nails have been sold by some makers outside this district at a price equivalent to \$2.35 Pittsburgh, but this cannot be considered the Pittsburgh price because mills here as yet will not meet that figure. On wire, orders and specifications are almost impossible to obtain at \$2.50 and to secure business it probably would be necessary for Pittsburgh mills to go as low as \$2.25.

We quote wire nails at \$2.75 base per keg, Pittsburgh, and bright basic and Bessemer wire at \$2.50 base per 100 lb., Pittsburgh.

Tin Plate.—The market presents a much stronger front this week than it did a week ago, as those mills which were then disposed to accept tonnages at less than \$4.75 per base box, Pittsburgh, have generally withdrawn the lower quotation. The official quotation of makers representing the great bulk of the production, is \$4.75. The export market also is stronger, due to the fact that Welsh makers are better off in the matter of orders than they have been before in some time and the rise in exchange has made it impossible for them to quote as low as they did recently. A few orders are coming in for shipment to Japan and China and the price has advanced from \$4 per base box, Pittsburgh, to \$4.25. (Make the price \$4.75 flat.)

We quote standard production coke tin plate at \$4.75 per base box f.o.b. Pittsburgh for carload lots.

Iron and Steel Pipe.—Effective, Dec. 15, the National Tube Co. issued new cards reducing prices on standard pipe, except on $\frac{1}{2}$ -in., large outside diameter, water well casing and oil country goods \$5 per ton, and line pipe \$6 per ton. New cards meeting this reduction have been issued by the independent companies, but makers of wrought iron pipe have made no change and still are holding to the schedules which became effective Sept. 1, last. The new card discount on base sizes of butt weld black steel pipe is 71 per cent off list. With no change in wrought iron pipe, the spread between the two kinds now is 26 $\frac{1}{2}$ points or \$53 per ton in the base sizes. New steel cards except in line pipe, give public affirmation of prices which recently have been quietly done. Pipe demands still are relatively good, although there has been a slight falling away as compared with recent weeks, due to the proximity of the end of the year. A number of promising line pipe inquiries are before makers, but the common impression is that none of them will be closed until after the turn of the year. The most recent business of this sort was of seven miles of 6-in. pipe, or about 350

tons, placed by the Tidewater Oil Co. with a Pittsburgh independent. The original inquiry of this company was for 150 miles, or 7500 tons, but this was scaled down to the seven miles just placed. Discounts are given on page 1638.

Boiler Tubes.—The National Tube Co. did not issue a new card of discounts on boiler tubes, when it set up new quotations on steel pipe, Dec. 15. The old discounts still are in effect and apparently are being more closely observed than was the case recently. This is explained less by the size of the demand, which, although better than it was a short time ago, is not really good, than by the fact that production is low and stocks are showing signs of exhaustion. Firmness in charcoal iron boiler tubes is due to much the same causes. The National Tube Co. has not yet resumed publication of discounts on seamless tubes. Discounts are given on page 1638.

Cold-Finished Steel Bars and Shafting.—Trade is seasonably quiet, but there seems to be a slightly better demand for shafting than for screw stock. We note the placing of one order for cold-rolled shafting involving about 150 tons of desirable sizes, at 2c. base, Pittsburgh. This is as low as makers are disposed to go, even on what might be termed attractive orders, and some are still adhering to a base of 2.15c. Since the first of the year, this class of material has declined from 3.60c. base, or \$72 per net ton, to 2c. base, or \$40 per ton, as compared with a decline in the same period in hot-rolled bars, of \$17 a ton, or from \$47 to \$30. Prices of cold-finished steel today not only reflect the decline in hot-rolled bars, but also a reduction in the conversion differential from \$25 to \$10 per ton. Pending further reductions in labor and freight costs, it is asserted that the present price of 2c. base is as low as makers of these bars can go safely. Ground shafting is quoted at \$2.50 base per 100 lb., f.o.b. mills, for carloads.

Hoops and Bands.—There is no improvement in the demand, or in prices. The regular quotation of makers is 2.25c. base, Pittsburgh, but 2c. is the basis of practically all business that is being done.

Spikes.—Demands are seasonably light and as price concessions would not create business, the more common tendency of makers is to hold to the recent bases of \$2.25 per 100-lb. for standard spikes and \$2.40 on small sizes. These prices probably will be shaded when there is any business to be secured. The Missouri Pacific Railroad is reported to have bought 1000 kegs of standard spikes recently, the business going to a Western maker. Prices are given on page 1638.

Nuts and Bolts.—Makers in this district still report business as slack with buyers confining purchases very closely to actual requirements and showing little interest in their future needs. The complaint still is common that adherence to quotations is costing local makers orders from outside points. Discounts are given on page 1638.

Rivets.—There has been no change in the official quotations of the larger makers, but it is admitted that on large rivets concessions have been made to buyers willing to place attractive orders and accept immediate delivery. On the great bulk of orders, which are for small lots, quoted prices prevail. Discounts and prices are given on page 1638.

Sheets.—Thus far all makers have successfully resisted attempts of buyers to force concessions from the regular prices, on black and galvanized sheets, of 3c. and 4c. base, respectively. The base price of 2.25c. on the lighter gages of blue annealed sheets also is well observed, but on the heavier gages some business still is being taken on the plate base. Business is seasonably light which makes the strict adherence to quotations all the more remarkable. The American Sheet & Tin Plate Co. is maintaining operations in excess of 60 per cent, but not more than 40 per cent of the independent mills are running. Prices are given on page 1638.

Hot-Rolled and Cold-Rolled Strips.—Inquiries are slightly more numerous and some makers actually have enjoyed an increase in orders, but in a broad way there still is considerable room for improvement. Prices show

no change, the bulk of business carrying a price of 2c. for hot-rolled and 3.75c. for cold-rolled. Regular or asking quotations range \$5 above those prices, but the chief effort of makers now is to maintain the lower figure.

Coal and Coke.—Negotiations are in progress covering the coke requirements of two merchant furnaces and two steel works furnaces in the Valley district for first quarter of 1922. Three of these furnaces now are in blast and owners of the other one are figuring on blowing it in after the turn of the year. Price ideas of beehive oven operators against such business range from \$3.25 to \$3.50, but it seems doubtful whether, if the business is placed with Connellsville producers, more than the lower figure will be paid. Steel works by-product plants can make pretty attractive prices on coke on the present price of coal, high grade by-product coal being offered at around \$2 per ton. There is almost no spot market in coke and such lots as come on the market are hard to dispose of. The common quotation on spot beehive oven furnace coke is \$2.75 per net ton, oven and on spot foundry grade \$3.75. One or two choice brands of foundry coke command up to \$4.25, but on the bulk of passing business the range is \$3.75. One or two choice brands of foundry coke command up to \$4.25, but on the bulk of passing business, the range is \$3.75 to \$4. The coal market is inactive except for some inquiries for by-product grade for first quarter shipment. On spot tonnages that grade is available anywhere from \$1.50 to \$1.85, with most sales right around \$1.65. Non-union steam coal is not hard to pick up at \$1.50 for immediate delivery. Mine run gets coal holds at \$2 to \$2.35.

Old Material.—The market is quieter than it has been, but retains much of the firmness created by the purchases of the Steel Corporation subsidiaries and a large independent interest. This may be explained by the fact that some dealers, who took Corporation business sold short on a portion of the tonnage and since they cannot ship from yard stocks, except at a loss, at the prices at which they sold, they are a little anxious to cover against these sales. This condition, rather than the demand from melters, is holding up prices. No recent sales of heavy melting grade have been done at less than \$14.50, save a few carloads which had to be moved, and some tonnage has been sold at \$14.75, while dealers have paid \$15. Slowing down of some steel works operations in other centers is releasing some tonnage and steel makers here lately have had offers of material from points which hitherto have been shipping elsewhere. A local melter had a call from the East recently for the first time in several weeks, and since Youngstown steel companies are taking little material, Pittsburgh consumers no longer have much competition from that point. There is little reason for changing prices much from those of a week ago. Almost no market exists for turnings and borings and prices are nominal. If a dealer had to sell turnings, the price would not be over \$8.50, but if a buyer wanted some \$9 would be minimum.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh.....	\$14.50 to \$14.75
No. 1 cast, cupola size.....	16.00 to 16.50
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	15.50 to 16.00
Compressed sheet steel.....	11.50 to 12.00
Bundled sheets, sides and ends.....	10.50 to 11.00
Railroad knuckles and couplers.....	15.00 to 15.50
Railroad coil and leaf springs.....	15.00 to 15.50
Low phosphorus standard bloom and billet ends	18.00 to 19.00
Low phosphorus plates and other grades	17.00 to 17.50
Railroad malleable	13.00 to 13.50
Iron car axles.....	25.00 to 26.00
Locomotive axles, steel.....	23.00 to 24.00
Steel car axles.....	15.50 to 16.00
Cast iron wheels.....	15.00 to 15.50
Rolled steel wheels.....	15.00 to 15.50
Machine shop turnings.....	8.50 to 9.00
Sheet bar crop ends.....	14.00 to 14.50
Heavy steel axle turnings.....	11.00 to 11.50
Short shoveling turnings.....	10.00 to 10.50
Heavy breakable cast.....	14.00 to 14.50
Stove plate	13.00 to 13.50
Cast iron borings.....	9.00 to 9.50
No. 1 railroad wrought.....	11.50 to 12.00

Chicago

CHICAGO, Dec. 30.

Little interest is manifested in any commodity except pig iron. As the New Year approaches, melters are looking to their first quarter and first half needs. A few have already bought for that delivery and others have issued inquiries for their requirements, five good-sized inquiries which have been issued within the past week aggregating more than 4000 tons. While the pig iron market is more active, prices have settled to a lower level, as low as \$19.50 base local furnace having been done.

Other iron and steel products are inactive and but for the fact that tonnage in heavy products is still coming in from carbilders and tank fabricators, mill operations would be adversely affected. This business, however, promises to tide the mills over until the New Year. The Inland Steel Co. remains on a 50 per cent basis, while the Illinois Steel Co. is operating at 43 per cent of ingot capacity, or slightly below its recent rate.

Most buyers, and the jobbers in particular, have withdrawn from the market until January. The opening of the New Year, however, is expected to bring out better business in some products, such as bolts and nuts and wire products, the jobbers' stocks of which are seriously depleted. In the heavier products, further tonnage is expected for the tank fabricators and car builders. It is to be noted, however, that orders for cars and car repairs have been few of late. General building prospects are regarded as favorable and fabricators believe that much work pigeon-holed by the architects will be sent out for bids.

Pig Iron.—Numerous foundries are shutting down during the holiday period, with the result that spot buying has fallen off appreciably. Greater activity in the New Year is forecasted by several recent purchases, and a number of attractive inquiries received by selling agencies. A western Michigan melter has closed for 500 tons of malleable for first quarter delivery at \$19.50, base, local furnace, while a northern Indiana consumer has bought 750 tons of foundry for first half shipment. Five good-sized inquiries for foundry, all calling for first half delivery are before the trade. Duluth, Milwaukee and Indiana users want 1000 tons each, whereas a Michigan consumer is in the market for 600 tons and a local melter for 500 tons. A sale of 100 tons of charcoal has been made at \$28, base furnace. Jackson County silvery makers are holding more rigidly to their official quotation of \$29.50, furnace, or \$34.82 delivered, Chicago, but resale material has been changing hands at from \$2 to \$3 under that price. The price situation is substantially unchanged except that local foundry, malleable and basic appear to be slightly weaker than a week ago. On an attractive tonnage it is probable that buyers will experience no difficulty in placing business at \$19.50, base furnace, while smaller lots are moving at \$20. The quotation on local by-product foundry coke remains \$11.25, delivered in the Chicago switching district, and some business for delivery early in 1922 has been taken on that basis.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago.....	\$31.50
Northern coke, No. 1, sil. 2.25 to 2.75.....	\$20.00 to 20.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25.....	19.50 to 20.00
Northern high phos.....	19.50 to 20.00
Southern foundry, sil. 1.75 to 2.25.....	24.17
Malleable, not over 2.25 sil.....	19.50 to 20.00
Basic.....	19.50 to 20.00
Low phos., Birmingham.....	32.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free.....	33.00
Silvery, sil. 8 per cent.....	32.02 to 34.82

Ferroalloys.—The Commonwealth Steel Co., St. Louis, has bought a car of 12 per cent Bessemer ferrosilicon at approximately \$35, delivered. The Haskell & Barker Co., Michigan City, has purchased a carload of ferromanganese at the ruling price. 76 per cent ferromanganese has been offered at \$62 delivered, Chicago.

We quote 78 to 82 per cent ferromanganese, \$66.75, delivered; 50 per cent ferrosilicon, \$60, delivered; spiegeleisen, 18 to 22 per cent, \$36 to \$37, delivered.

Rails and Track Supplies.—The Burlington, reported two weeks ago as having tentatively closed for its 1922 rail requirements, has made definite reservations for 25,000 tons, divided between the Illinois and Colorado mills. On the whole, the rail market is unusually quiet for this time of the year, the plans of most roads still being in the formative stage. The Rock Island will buy less than 45,000 tons, probably from 30,000 to 40,000 tons. This line still has 13,000 tons coming on its 1921 contract. The Chicago & Northwestern does not expect to order more than 10,000 tons. The Santa Fe, the Northern Pacific, the Great Northern and the Minneapolis & St. Louis expect to place orders but have not determined on the tonnages they will place. Track supplies are quiet. Small sales of track bolts and spikes have been made, some spikes having been placed at as low as 2.15c., Pittsburgh.

Standard Bessemer and open-hearth rails, \$40: light rails rolled from new steel, 1.70c. to 1.75c. f.o.b. makers' mills.

Standard railroad spikes, 2.15c. to 2.25c., Pittsburgh; track bolts with square nuts, 3.20c. to 3.25c., Pittsburgh; tie plates, steel and iron, 1.90c. to 2c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

Railroad Rolling Stock.—The Illinois Central has deferred action on its car inquiry until January and the Burlington will not close for its cars before that time. The Great Northern is expected to buy its freight cars this week, and an unconfirmed report is current to the effect that it has already placed 500 refrigerator cars with the General American Car Co.. The same road has let repairs on 50 passenger cars to the Pullman Co. The Grand Trunk, Western lines, is inquiring for repairs on 500 hopper cars. The Western Maryland is asking for figures on the repair of 1000 hopper cars, and the Lehigh Valley is inquiring for repairs on 1000 gondola and hopper cars.

Bars.—Except for tonnage coming from car builders, little is being added to the books of merchant bar mills. Jobbers are notably absent from the market and other buyers show little interest in it. In the reinforcing field, there are few new jobs to report. The Paul J. Kalman Co. will furnish 200 tons for the Standard Dry Goods Co. Building, Huntington, W. Va., while the Inland Steel Co. will supply 300 tons for the Philipsborn's Inc. Building, Chicago. Bids have been taken at Davenport on 150 tons for highway work in Scott county, Iowa. Demand for bar iron is still of a spasmodic character and in the aggregate light. One local mill has booked an order for 900 tons from a railroad, the largest individual tonnage placed for some time. Prices are slightly weaker, the market being quoted from 1.60c. to 1.65c., Chicago. The hard steel bar situation is unchanged.

Mill prices are: Mild steel bars, 1.60c. to 1.75c., Chicago; common bar iron, 1.60c. to 1.65c., Chicago; rail carbon, 1.65c., mill or Chicago.

Jobbers quote 2.68c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.55c. for rounds and 4.05c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.38c. base. Hoops and bands, 3.28c.

Wire Products.—Buying has fallen off appreciably during the past fortnight and current purchases are confined to imperative needs on which immediate shipment is asked. Jobbers' stocks are known to be generally low, however, and as soon as the inventory-taking period is past, better business is expected to develop. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 1638.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, \$3.48 per 100 lb.; No. 9 and heavier bright basic wire, \$3.63 per 100 lb.; common wire nails, \$3.65 per 100 lb.; cement coated nails, \$3.05 per keg.

Sheets.—Buyers generally are holding aloof from the market and in some cases those who have orders on mill books have asked that delivery be deferred until after Jan. 1. Prices appear to be firm and notwithstanding the lull in buying the local independent is operating 17 out of 18 mills with every prospect of closing the year at that rate.

Mill quotations are 3c. for No. 28 black, 2.25c. for No. 10 blue annealed and 4c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.38c.; No. 28 black, 4.15c.; No. 28 galvanized, 5.15c.

Plates.—Except for tonnage coming from the car builders and the tank fabricators, there is little plate business moving. Jobbers have apparently withdrawn from the market until next year and orders from miscellaneous sources are practically nil. The price situation is unchanged.

The ruling mill quotations range from 1.60c. to 1.75c. Chicago. Jobbers quote 2.78c. for plates out of stock.

Bolts and Nuts.—The market shows no signs of strength. Jobbers' stocks, however, are scraping bottom in many instances and for that reason sellers expect better business next month. There continue to be some railroad inquiries before the trade and these are bringing out concessions, some makers quoting f.o.b. Chicago. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 1638.

Jobbers quote structural rivets, 3.43c.; boiler rivets, 3.53c.; machine bolts up to $\frac{1}{2}$ x 4 in., 60, 10 and 10 per cent off; larger sizes, 60 and 10 off; carriage bolts up to $\frac{1}{2}$ x 6 in., 60 and 10 off; larger sizes, 55 and 5 off; hot pressed nuts, square and hexagon tapped, \$3.75 off; blank nuts, \$4 off; coach or lag screws, gimlet points, square heads, 65 and 5 per cent off. Quantity extras are unchanged.

Cast-Iron Pipe.—The market is dull as the holidays draw near and almost no new inquiries are reported. Sellers, however, look ahead to January hopefully, as many municipalities that have been unable to go ahead with improvements, because of the numerous high interest bearing industrial securities issued during the past year, now find that they can market their bonds without difficulty. Springfield, Ohio, has let 760 tons to the United States Cast Iron Pipe & Foundry Co. and 80 tons of 6-in. to James B. Clow & Sons. Hammond, Ind., took bids on 40 tons of 6-in. yesterday.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., \$47.10 to \$48.10; 6-in. and above, \$43.10 to \$44.10; class A and gas pipe, \$4 extra.

Structural Material.—Fabricators look forward hopefully to the new year, believing that the time is approaching when other elements in building costs will decline in proportion to steel with the result that the numerous projects still in the hands of architects will be released for bids. A recent investigation of the building situation by a committee appointed by the mayor of St. Louis disclosed the fact that many large jobs in that city will be started as soon as certain factors entering into construction costs, notably labor, coal and transportation, have undergone liquidation commensurate with other elements. The largest new inquiry to come before the trade is warehouse No. 12 for the Belknap Hardware & Mfg. Co., Louisville, Ky., which will require about 5000 tons. Graham, Anderson, Probst & White, Chicago, are the architects. Plain material is available at about the same prices as plates and soft steel bars, small lots bringing a maximum of 1.75c., Chicago, while large tonnages can be bought at from 1.60c. to 1.65c. Recent fabricating awards include:

J. L. Taylor Co. building, Chicago, 1000 tons, to Duffin Iron Works.

Bank of Italy building, Los Angeles, 1500 tons, to Llewellyn Iron Works.

Tiffin Theater building, Chicago, 336 tons, to Hansell-Elcock Co.

Pending business includes:

Illinois Central Railroad, freight car repair shop, McComb, Miss., 700 tons.

Hotel at Johnson City, Tenn., 550 tons.

Federal Reserve Bank, Nashville, Tenn., 200 tons.

Cell house F for new State penitentiary, Lockport, Ill., 200 tons.

The mill quotation on plain material ranges from 1.60c. to 1.75c., Chicago. Jobbers quote 2.78c. for materials out of warehouse.

Warehouse Prices.—The recent reduction in mill prices on pipe has been reflected in lower warehouse price. Standard black 3-in. pipe was reduced from \$30.60 to \$28.69 per 100 ft. and the same size in galvanized from \$41.31 to \$39.40. Other sizes were reduced in proportion.

Old Material.—Except for a purchase of about 1500 tons of heavy melting and miscellaneous grades, including some No. 1 busheling, the market has been inactive. The heavy melting is reported to have been bought at \$11 delivered and the busheling at \$10 per gross ton delivered. Several inquiries for cast scrap have been received from foundries, but all of them ask

for January shipment. The market is generally quiet and weak, some grades having definitely dropped another notch down the scale. Railroad lists include the Rock Island, 4500 tons, and the Grand Trunk, Western Lines, 5700 tons.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton
Iron rails	\$16.00 to \$16.50
Relaying rails	23.00 to 27.50
Cast iron car wheels	15.50 to 16.00
Rolled or forged steel car wheels	13.00 to 13.50
Steel rails, rerolling	12.50 to 13.00
Steel rails, less than 3 ft.	12.50 to 13.00
Heavy melting steel	11.00 to 11.50
Frogs, switches and guards cut apart	11.00 to 11.50
Shoveling steel	10.50 to 11.00
Low phosphorus, heavy melting steel	13.50 to 14.00
Drop forge flashings	8.00 to 8.50
Hydraulic compressed sheet	8.00 to 8.50
Axle turnings	8.50 to 9.00

	Per Net Ton
Iron angles and splice bars	14.00 to 14.50
Steel angle bars	11.00 to 11.50
Iron arch bars and transoms	15.00 to 15.50
Iron car axles	19.50 to 20.00
Steel car axles	13.00 to 13.50
No. 1 busheling	8.50 to 9.00
No. 2 busheling	6.00 to 6.50
Cut forge	10.50 to 11.00
Pipes and flues	6.50 to 7.00
No. 1 railroad wrought	10.50 to 11.00
No. 2 railroad wrought	10.00 to 10.50
Steel knuckles and couplers	11.00 to 11.50
Coil springs	12.50 to 13.00
No. 1 machinery cast	12.50 to 13.00
No. 1 railroad cast	12.00 to 12.50
Low phosphorus, punchings	11.00 to 11.50
Locomotive tires, smooth	10.00 to 10.50
Machine shop turnings	3.50 to 4.00
Cast borings	5.50 to 6.00
Stove plate	12.00 to 12.50
Grate bars	10.50 to 11.00
Brake shoes	10.50 to 11.00
Railroad malleable	11.50 to 12.00
Agricultural malleable	11.50 to 12.00

Birmingham

BIRMINGHAM, ALA., Dec. 20.

Pig Iron.—Iron makers come to the close of the year with less concern over the present price base than with reference to 1922 demand. General feeling is rather buoyant. With only 50,000 tons of merchant iron on yards, the strategic position is regarded as exceptionally strong. Southern foundry operations will, as a rule, continue to eve of Christmas and suspend until Jan. 3. Indications point to increase of melt in 1922. The aggregate of sales during the week was small. Several hundred tons was taken by Indiana melters and was an agreeable surprise in view of the little business done in competitive fields. The base is \$17.50. The Sloss-Sheffield company, having reduced large yard holdings to comparatively small, has decided to blow in a Sheffield stack Jan. 1 and is now preparing it for blast. Sheffield enjoys a freight advantage over Birmingham to competitive markets. The outstanding feature of the week was the shipment of 1300 tons of iron to Los Angeles by way of ship out of Mobile, which affords a rate of about half of the all-rail rate, which is \$20. This iron was among the first lots sold when the market receded from a base of \$19 to one of \$18. Inquiry for 1922 iron is meager and seldom for the entire first quarter. Current business has been almost exclusively for carloads of prompt iron.

We quote per gross ton f.o.b. Birmingham district furnaces, as follows:

Foundry, silicon 1.75 to 2.25	\$17.50
Basic	16.50
Charcoal, warm blast	35.00

Finishing Mills.—Tennessee company is on a 66 2/3 ingot capacity and Gulf States Steel Co. 50 per cent. Conners Steel Co. has resumed at its Woodlawn hoop and band mill. Wire and nails are slow. Sheet steel for galvanized roofing and small sizes of steel pipe are active. Nine hundred tons of steel plates was shipped to Los Angeles and San Francisco last week via Mobile.

Cast Iron Pipe.—Shops will work to eve of Christmas and resume Jan. 3. Sanitary pipe makers are receiving a fair amount of new business and feel confident of good business in 1922. San Juan and Ponce, Porto Rico, took 600 tons via Mobile this week. Pacific Coast shipments both of sanitary and high pressure pipe were heavy, destinations being Los Angeles, San Francisco, Seattle and San Diego. Sanitary pipe base

is \$40, but trade is asking for lower prices following cut in steel and wrought pipe. No concessions have been made.

Coal and Coke.—Local coal yards have cut prices \$1 to \$2 a ton following loss of business to wagon mines and dull business incident to warm weather. Best coals now retail at \$7 to \$7.50. Steam coal is very dull. The first shipment of Alabama bunker coal to Galveston by ocean-going craft out of Mobile was made this week. Return cargoes of sulphur for acid plants are expected.

Old Material.—The scrap market is without feature. Dealers are holding in hope of better prices and because consumers have quit buying.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	\$11.00 to \$12.00
No. 1 steel.....	10.00 to 11.00
No. 1 cast.....	14.00 to 15.00
Car wheels	13.00 to 14.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought.....	12.00 to 13.00
Stove plate	11.00 to 12.00
Cast iron borings.....	6.00 to 7.00
Machine shop turnings.....	6.00 to 7.00

Boston

BOSTON, Dec. 20.

Pig Iron.—Business took a decided slump here this week, the aggregate sales being 1500 to 1600 tons, as contrasted with 13,000 for the previous week. With the disappearance of large prospective orders, most of those eastern and central Pennsylvania and Buffalo furnaces heretofore willing to shade prices to secure business have raised quotations, while those not securing business recently have lowered quotations, resulting in a narrower range of prices. One eastern Pennsylvania furnace, heretofore not having a regular New England representative, is understood to have arranged for one and will make an official announcement to this effect shortly. The market on Buffalo iron is \$19 to \$20 base, with little attention paid silicon differentials. Three or four 100-ton lots of silicon 3.25 to 3.75 and higher sold this week at \$20.50 furnace. Other sales of No. 2X are reported at approximately \$25 delivered. Central Pennsylvania No. 2X also sold on the same delivered base. One furnace in this district has raised its base price from \$19.50 to \$20. The few lots of eastern Pennsylvania iron sold this week were largely resale of \$20 furnace base and higher. The only important inquiry in the market is for 500 tons, half No. 2 plain, and half No. 2X, with special sulphur content, January delivery, from a textile machinery maker.

We quote delivered at common New England points as follows, having added to furnace prices \$4.06 freight from eastern Pennsylvania, \$5.46 from Buffalo, \$6.58 from Virginia and \$10.66 from Alabama:

East. Penn., silicon 2.25 to 2.75.....	\$24.56 to \$25.06
East. Penn., silicon 1.75 to 2.25.....	24.06 to 24.56
Buffalo, silicon 2.25 to 2.75.....	24.46 to 25.96
Buffalo, silicon 1.75 to 2.25.....	24.46 to 25.46
Virginia, silicon 2.25 to 2.75.....	30.08 to 31.08
Virginia, silicon 1.75 to 2.25.....	29.58 to 30.58
Alabama, silicon 2.25 to 2.75.....	29.16
Alabama, silicon 1.75 to 2.25.....	28.66

Cast Iron Pipe.—The city of Salem, Mass., on Dec. 22, 10 a.m., will open bids for 1200 to 1300 ft. 8-in. pipe and a small amount of specials. The city of Providence, R. I., on Dec. 27, 2.15 p.m., will open bids on 400 tons 6 to 16-in. pipe and three tons of castings. In both instances deliveries are for 1922. Indications are more cast iron pipe business will be closed in New England between now and the end of spring than ever before. Several of the largest cities already are quietly sounding out the market. The pipe makers so far are holding closely to prices quoted last month, as follows: Per net ton f.o.b. Boston and district, in carload lots, 3-in., \$66.70; 4-in., \$56.70; 6-in., \$50.70; 10-in. and larger, \$49.70, with \$4 differentials on class A and gas pipe.

Finished Material.—A Cambridge, Mass., fabricator this week was awarded about 100 tons of structural steel for a Boston school. The market otherwise is quiet at 1.50c. f.o.b. Pittsburgh. Bids will be opened Dec. 22 on 300 tons of plates for an Arlington, Mass., water tower. Going and prospective business otherwise is confined to carload and smaller lots, with the market 1.50c., Pittsburgh, on attractive tonnages and 1.55c. and

1.60c. on ordinary tonnages. Boiler makers are cutting prices materially in order to secure what little business is available. The demand for bars and other steel products is quiet on a basis of 1.50c., Pittsburgh, for bars. An inquiry for a carload of one size of bolts features that market. The warehouse business has fallen off noticeably since last reports.

Jobbers now quote: Soft steel bars, \$2.71½ per 100 lb. base; flats, \$3.21½; concrete bars, \$2.20 to \$2.71½; tire steel, \$4 to \$4.40; spring steel, open hearth, \$4.50; crucible, \$11.50; steel bands, \$3.31½ to \$3.78; steel hoops, \$3.31½; toe calk steel, \$5; cold rolled steel, \$3.75 to \$4.25; structural steel, \$2.71½; plates, \$2.81½ to \$2.99; No. 10 blue annealed sheets, \$3.73; No. 28 black sheets, \$4.50; No. 28 galvanized sheets, \$5.50; refined iron, \$2.71½; best refined, \$4.25; Wayne iron, \$5.50; Norway iron, \$5.50 base.

Coke.—The New England Coal & Coke Co. reports a falling off in shipments of by-product foundry coke from the ovens due to a desire on the part of consumers to have as little stock on hand as possible during inventory taking. The tonnage booked by the company for first half of 1922 shipment at prices ruling date of shipment, has materially improved since last reports, however, due to several of the largest consumers covering their requirements. The Providence Gas Co. is operating and shipping at 100 per cent of capacity, and also has booked attractive tonnages for first half shipment this week. Both companies continue to quote spot foundry coke at \$10.66, delivered, or 21c. or more above the Connellsburg base.

Old Material.—Going business continues limited and prices on several kinds of old material are easier under their own weight. Cast iron borings are an exception, however. Offers by dealers to purchase round tonnages suitable for chemical purposes at \$6.25 have been turned down, the owner finally letting go at \$8. The average dealers' price is \$7 to \$7.25, or 50c. above last week. Rolling mill borings are in light demand, but firmer in sympathy with chemical. Turnings, on the other hand, are easier, and the same is true of car wheels and re-rolling rails. A sale of 500 tons No. 1 heavy melting steel to a Massachusetts consumer at \$11, delivered, is reported. The market on No. 1 machinery cast holds at \$18 to \$19, delivered, with car lots of textile machinery reported sold at \$18.65 and \$18.95. It is difficult to find a market for stove plate at any price. While the market can be considered all of \$1 lower, quotations are purely nominal.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast.....	\$18.00 to \$19.00
No. 2 machinery cast.....	16.00 to 17.00
Stove plate	14.50 to 15.00
Railroad malleable	13.50 to 14.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melt'ng steel.....	\$7.50 to \$8.00
No. 1 railroad wrought.....	11.00 to 11.50
No. 1 yard wrought.....	9.00 to 9.50
Wrought pipe (1-in. in diameter, over 2 ft. long).....	7.00 to 7.50
Machine shop turnings.....	3.50 to 3.75
Cast iron borings, rolling mill.....	5.75 to 6.50
Cast iron borings, chemical.....	7.00 to 7.25
Blast furnace borings and turnings.....	3.50 to 3.75
Forged scrap and bundled skeleton.....	4.50 to 5.00
Steel car axles and shafting.....	11.50 to 12.00
Car wheels	11.00 to 11.50
Rerolling rails	10.00 to 10.50

Working on Proposed Merger

YOUNGSTOWN, Dec. 20.—Accounting and auditing departments of a number of Valley steel interests active in current merger negotiations are working overtime—at night, Saturday afternoons and occasionally Sundays—compiling data and necessary information. It is the impression that plants located in the Mahoning Valley will reveal substantial property valuations, both in conversion equipment and in holdings of raw materials.

The twenty-sixth annual winter mining session of the College of Mines, University of Washington, Seattle, Wash., will be held during the 12 weeks from Jan. 5 to March 22. This session is open to any interested man who can read and write English. The expenses will be limited to a tuition fee of \$15, laboratory deposits to cover materials actually used and the cost of the necessary text books. The training consists of lectures with laboratory practice, for which the laboratories of the College of Mines are equipped.

Cincinnati

CINCINNATI, Dec. 20.

Pig Iron.—Lower prices developed during the week on Southern iron, and a sizeable tonnage can now be negotiated on the basis of \$17, Birmingham. It is said that this price has already been done on a purchase of 1000 tons by a Kentucky sanitary manufacturing company, the order being split between two furnaces. The same company is reported to have made an offer of 500 tons to a third furnace at the same figure. A Southern furnace has intimated that a \$17 price would be acceptable on a sizeable tonnage for prompt shipment, and while \$17.50 is still being quoted on carload business, the market is gradually working toward the lower figure. In the North more is heard of \$19, and it is reported that this figure has already been reached in sales to consumers with high priced contracts, but \$19.50, furnace, seems to be the minimum open quotation, and silicon differentials are being given away in many cases. There is almost no inquiry from this district. A radiator company is inquiring for 1000 tons and a northern Ohio melter for 200 tons of low phosphorus. Sales include, besides the one mentioned above, 250 tons to the Louisville & Nashville Railroad, and 300 tons to the Indiana Reformatory. The Norfolk & Western Railroad was also a purchaser, taking 250 tons of malleable from a southern Ohio producer. The trade, while unusually dull, at this time, is looking for better things with the turn of the year, and it is expected that business during the month of January will greatly exceed any month this year.

Based on freight rates of \$4.50 from Birmingham and \$2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sll. 1.75 to 2.25 (base)	\$21.50 to \$22.00
Southern coke, sll. 2.25 to 2.75 (No. 2 soft)	22.00 to 22.50
Ohio silvery, 8 per cent sll.	30.02
Southern Ohio coke, sll. 1.75 to 2.25 (No. 2)	22.02 to 22.52
Basic, Northern	22.02
Malleable	22.52

Finished Material.—A slight improvement is noticed in the demand for sheets and reinforcing bars, and several 100-ton orders have been placed during the week. The sheet market is firm at 3c. for black and 4c. for galvanized. On blue annealed, some mills are quoting on the plate basis. The regular quotation on blue annealed is 2.25c. On reinforcing bars, 1.50c. is the common quotation, and practically all of the orders are being placed at this figure, although occasionally carload lots are moving at 1.55c. to 1.60c. There is little activity in plates and shapes and 1.50c. represents the market. A reduction of 2½ points on base prices of standard pipe, black and galvanized, and 3 points on base prices of line pipe, became effective Dec. 15. On wire nails it is said that some mills in this territory are willing to accept business on the basis of \$2.60 per keg, but so far few orders have been placed. This offer, it is said, refers only to orders for immediate shipment and will not be effective after Jan. 1. Plain wire is generally quoted at \$2.25 per 100 lb., hoops and bands at 2c. to 2.15c. and cold-rolled shafting at 2c. to 2.15c. On light rails, orders are scarce, as most of the mining companies in operation in this section of the country are running only two days a week. There are a large number of mines closed down entirely. There is little activity in the structural field. The largest proposition is for a municipal auditorium and market building at Memphis, Tenn. This will take approximately 3000 tons of structural steel and 400 tons of reinforcing bars. Bids will close on Jan. 3 with C. O. Pfeil, Union & Planters Bank Building, Memphis, Tenn. The Southern Railway is inquiring for one 100-ton bridge span, and the Procter & Gamble Co. has an inquiry out for 50 tons of structural steel for a building at its Port Ivory, New York, plant. No award has yet been made on the building for the Standard Sanitary Mfg. Co. at Louisville. The American Bridge Co. will fabricate a small tonnage for an addition to the Soldiers' Home at Dayton, Ohio. The Knights of Pythias, Dayton, Ohio, are contemplating the erection of a 10-story hotel and club building in that city and it is likely the proposition will take definite shape after the first of the year. The Illinois Car Co., with head offices in Chicago, and a plant at Urbana, Ohio, is understood to be contemplating dismantling

its present plant and erecting a new one, 600 by 200 ft. Plant operations do not materially change. The East-side Plant of the American Rolling Mill Co. will run at capacity during the week, and the Whitaker-Glessner Co. at Portsmouth will continue last week's schedule. The Ashland Iron & Mining Co. is running at 50 per cent of capacity. The plants of the Andrews Steel Co. and the Newport Rolling Mill Co. at Newport, Ky., where a strike is in progress, resumed operations during the week and it is expected that this week they will be on a 50 per cent basis. The plants are being operated on an open shop basis.

Warehouse Business.—There is very little to report. Business is very quiet and it is not expected that much improvement will be shown until the first of the year. Prices of galvanized sheets have been advanced \$5.00 a ton, these now being quoted by local jobbers at 5.25c.

Iron and steel bars, 2.90c. base; hoops and bands, 3.50c. base; shapes and plates, 3c. base; reinforcing bars, 2.97½c. base; cold rolled rounds, 1½-in. and larger, 3.70c.; under 1½-in. and flats, squares and hexagons, 4.20c.; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; wire nails, \$3.25 per keg base; No. 9 annealed wire, \$3 per 100 lb.

Coke.—In the coke market, there are evidences of increased activity. Some West Virginia producers are understood to be preparing to light some ovens, and one operator has already fired about 60. Fair inquiries for first half are current, but the spot market continues dull. Prices are quotably unchanged.

Old Material.—The scrap market is standing still as regards sales, but dealers are buying sparingly at prices so low that they can afford to speculate a little. Better things are looked for after the first of the year. In the meantime, all consumers in this district remain out of the market.

We quote dealers' buying prices, f.o.b. cars:

	Per Gross Ton
Bundled sheets	\$3.50 to \$4.00
Iron rails	12.00 to 12.50
Relaying rails, 50 lb. and up	25.00 to 26.00
Rerolling steel rails	10.50 to 11.00
Heavy melting steel	9.00 to 9.50
Steel rails for melting	9.00 to 9.50
Car wheel's	12.00 to 13.00
	Per Net Ton
No. 1 railroad wrought	8.50 to 9.50
Cast borings	3.00 to 3.50
Steel turnings	2.00 to 2.50
Railroad cast	12.00 to 12.50
No. 1 machinery	13.50 to 14.50
Burnt scrap	7.50 to 8.00
Iron axles	15.50 to 16.50
Locomotive tires (smooth inside)	9.50 to 10.00
Pipes and flues	4.00 to 4.50

Buffalo

BUFFALO, Dec. 20.

Pig Iron.—Most furnaces continue to announce firm adherence to the \$20 base price for New York delivery, notwithstanding information from the East that Buffalo iron is quoted as low as \$18. An interest, which quoted \$19 on the Westfield, Mass., business, announces it did not get any portion of the order. Total sales for the week are less than 3000 tons. Inquiry has likewise fallen off. The one producer who has sold no iron in more than 30 days sees no immediate change in sight and 80 per cent of its iron production is now utilized in its steel-making departments. The Donner Steel Co. will blow out one of the two furnaces in blast to make repairs and the stack will be blown in again shortly after Jan. 1. A group of inquiries engaging one furnace consists of 7500 tons and with the exception of one for 3000 tons, the rest is for small lots.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sll.	\$20.00 to \$21.00
No. 2X foundry, 2.25 to 2.75 sll.	19.50 to 20.50
No. 2 plain, 1.75 to 2.25 sll.	19.00 to 20.00
Basic	20.00 to 21.00
Malleable	20.00 to 21.00
Lake Superior charcoal	31.75

Finished Iron and Steel.—Apathy usual at the holiday season is more pronounced and the lack of interest in bars is especially marked. Reduction in pipe prices of two and a half points on base or the equivalent of \$5 per ton has not had a noticeable effect on business. Sheet demand is fair and prices are firm. An order for approximately 500 tons for a buyer outside Buffalo, taken by a sheet maker at \$3 for No. 28 black, is in-

dicate of the acceptance of this schedule. On bars, shapes or plates 1.50c. is a common quotation and there is no difficulty in placing business at that figure. Little of moment is in prospect in structural business. The Statler Hotel interests have decided to add two stories to the new building now under construction and it is likely the additional fabricating will be done by the Fort Pitt Bridge Co., now doing the original job. The new Ford hotel for Delaware Avenue, Buffalo, is to be awarded in the spring. Several attractive plate inquiries appeared within the week, but prices quoted by one agency were said to be out of line and the business was not placed here. Elimination of the transportation tax Jan. 1 is believed to have an effect on business. Although stocks are low, a number of buyers have indicated that one objection to ordering now is that a saving by waiting until this tax is lifted is worth while. Some inquiry for prices on January business has appeared, but little of importance with respect to future business is engaging any interest.

Warehouse Business.—With the exception of a fair structural demand, which continues because of open weather, there is a general lull in warehouse business. The usual lack of interest at this time is more noticed this year.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.80c.; plates, 2.80c.; plates, No. 8 gage, 3.50c.; soft steel bars and shapes, 2.70c.; hoops and bands, 3.30c.; blue annealed sheets, No. 10, 3.55c.; galvanized steel sheets, No. 28, 5.25c.; black sheets, No. 28, 4.25c.; cold-rolled strip steel, 5.90c.; cold-rolled round shafting, 3.80c.

Old Material.—Low production in turnings and borings keeps dealers from quoting on inquiries for these products. Steel orders are being filled at \$13.50, but the supply is limited and mills are buying what is offered readily. The matter of shipping becomes important as the end of the year approaches and every effort is made by dealers to keep stocks at the lowest ebb by delivering as quickly as possible.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel.....	\$13.00 to \$14.00
Low phos., 0.04 and under.....	17.00 to 18.00
No. 1 railroad wrought.....	15.00 to 16.00
Car wheels.....	16.50 to 17.50
Machine shop turnings.....	7.50 to 8.00
Cast iron borings.....	7.00 to 8.00
Heavy axle turnings.....	10.50 to 11.50
Grate bars.....	12.00 to 13.00
No. 1 busheling.....	10.00 to 11.00
Stove plate.....	15.00 to 16.00
Bundled sheet stampings.....	8.00 to 9.00
No. 1 machinery cast.....	17.00 to 18.00
Hydraulic compressed.....	10.50 to 11.50
Railroad malleable.....	13.00 to 14.00

Cleveland

CLEVELAND, Dec. 20.

Iron Ore.—The refusal of the Interstate Commerce Commission to allow the railroads to extend the present rail rates on iron ore from lower lake ports to interior furnaces from Jan. 1 to March 31 has not had the effect of increasing dock shipments. After the 28 per cent reduction was made on ore rates Oct. 20, there was a marked increase of shipments from docks, as consumers wanted to take their ore in before Jan. 1 when the higher rates were to be restored. They also wanted to move what ore they needed before the cold weather set in that would interfere with handling. Dock shipments during November were fairly heavy, the amount shipped from Lake Erie docks during that month being 1,001,252 tons. Most of the furnaces now have all the ore in their yards that they will need up to April 1 and the attempt of the railroads to extend the lower rail rates to April 1 and the refusal of the Interstate Commerce Commission to permit the extension was of little immediate interest to consumers.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, \$6.45; Old range non-Bessemer, 51½ per cent iron, \$5.70; Mesabi Bessemer, 55 per cent iron, \$6.20; Mesabi non-Bessemer, 51½ per cent iron, \$5.55.

Pig Iron.—Competition for business at competitive points has resulted in a further weakening of the pig iron market and in several cases a \$19 quotation has been made on No. 2 foundry iron by one or two lake furnaces where the inquiry has not been within the immediate territory of the furnace naming that price. Lake furnaces that have been getting above \$20 for foundry iron for nearby shipment where there is no competition are now quoting \$20 as a minimum. In

the Mahoning Valley, prices have settled back to \$20 for foundry iron, a decline of 50c. a ton on a purchase at that price of 3000 tons by the Standard Sanitary Mfg. Co. for early shipment, 2000 tons from a Valley furnace of a Cleveland interest and 1000 tons from another Cleveland producer. The same buyer purchased 1500 tons of Southern foundry iron at \$17 for No. 2. An Ohio stove manufacturer during the week purchased 1000 tons of foundry iron from a Cleveland furnace. On the whole, the market continues quiet, buying being mostly in small lots for immediate requirements. One lake producer sold 1500 tons during the week, all in small lots. For Cleveland delivery, local furnaces continue to quote foundry iron at \$20 to \$20.50 at furnace. A new low price on basic iron has appeared in the purchase of 2500 tons at \$18.25 by a Valley district steel maker from a Valley producer. We note the sale of 250 tons of low phosphorus iron at \$34 but a local consumer has purchased a small lot of resale low phosphorus iron at under \$33. We also note the sale of two car lots of Ohio silvery iron at \$28 for 7 per cent, this being the regular price.

Quotations below are f.o.b. local furnace for Northern foundry iron, not including a 56c. switching charge. Other quotations are delivered Cleveland, being based on a \$1.96 freight rate from Valley points, a \$3.36 rate from Jackson and a \$6.67 rate from Birmingham:

Basic	\$20.21 to \$20.71
Northern No. 2 fdy., sil. 1.75 to 2.25	19.00 to 20.00
Southern fdy., sil. 2.25 to 2.75.....	24.67 to 25.17
Ohio silvery, sil. 8 per cent.....	32.86
Standard low phosph., Valley furnace.....	34.00

Mining Operations.—Although many mining companies have unusually large stock piles there is a disposition to resume mine operations in order to provide work for the miners. In some of the mining districts, the men have had little work this year and with the long period of unemployment their situation is growing very serious. Although mining companies have no need for the ore, they are starting up some mines to prevent suffering during the winter among the miners and their families. Following this policy, M. A. Hanna & Co. are resuming operations at four mines, the Fay, Thorne, Leonard No. 3 and Harold in the Mesabi district. This firm recently resumed operations in two mines in the Menominee district.

Bolts, Nuts and Rivets.—The demand for bolts and nuts is very light with orders confined to small lots. Local makers are holding to regular prices. There is little activity in rivets. Some makers are still granting concessions of from \$1 to \$3 per ton from the regular quotations of 2.40c. for structural and 2.50c. for boiler rivets. Some inquiries have come out for first quarter contracts, but the leading local maker has declined to quote prices for that delivery.

Semi-Finished Steel.—Sheet bars are being offered at \$29, although \$30 is the usual quotation. Some inquiry is coming out and a fair buying activity is looked for early next month. Slabs are quoted at \$29, Youngstown, but there are reports that this price has been shaded.

Finished Iron and Steel.—While there is virtually no inquiry for round lots of steel, the volume of small orders is holding up well for this season of the year. Buyers are showing no disposition to contract for the first quarter. Plates are more active than other items. One order was placed for 300 tons of plates for oil still bottoms. In this territory there is apparently no shading of the 1.50c. price on steel bars, plates and structural material and the price has become more general, although small lot sales are still being made at 1.60c. Ohio tank shops are reported to be well filled with work and some of the recent orders for oil tanks have gone to other districts. It is stated that the oil tank work that has been placed for the Mexia, Tex., field will require, 60,000 to 75,000 tons of plates. A local mill is quoting light plates on a 1.75c. basis, making a 2.10c. price, or \$3 a ton lower than blue annealed sheets. Hard steel reinforcing bars are very dull and weak. Lower prices on soft steel bars have forced hard steel bars down to 1.45c. and a 1.40c. price would probably be named on a desirable order. Light rail prices are weak with quotations ranging from 1.45c. to 1.50c. Hoops and bands in the wider sections continue weak with reports of quotations as low as 1.70c. made by strip mills. In structural lines, architects are working

on a number of projects and more activity is expected early in the year. The Canton Bridge Co. has taken 200 tons for a plant for the Sanderson Cyclone Drill Co., Orrville, Ohio, and the Moss Iron Works, Wheeling, 125 tons for a school in Ravenna, Ohio. Inquiries are out for 200 tons for the Broadway Bank of the Union Trust Co., Cleveland, and for 175 tons for a bank building for the Elyria Savings & Trust Co., Elyria. The Cuyahoga County Commissioners are taking steps to go ahead with the Huron-Lorain bridge, Cleveland, which will take 6000 tons or more of steel if all-steel construction is decided upon.

Jobbers quote steel bars, 2.54c.; plates and structural shapes, 2.64c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 3.75c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.10c.; hoops and bands, 3.14c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Sheets.—The demand for sheets has fallen off, as consumers wish to keep their stocks low at inventory time. The regular prices of 3c. for black, 4c. for galvanized and 2.25c. for blue annealed sheets are being maintained.

Warehouse Business.—Some of the jobbing houses report that warehouse sales are still in better volume than last month. However, warehouse orders for sheets have become very light. Prices are unchanged.

Coke.—The coke market continues dull. Some car lot sales are reported, the more common prices being \$4 to \$4.25 for standard Connellsburg makes, although one maker is asking \$4.75.

Old Material.—The market is very dull, but prices are fairly firm and quotations are unchanged. No new demand has come from consumers and two mills using scrap from this territory have held up on shipments. There is little trading between dealers although there is some activity in machine shop turnings. The trade expects consumers to come in the market again early in January.

We quote per gross ton, f.o.b. Cleveland, as follows:	
Heavy melting steel	\$11.50 to \$12.00
Steel rails, under 3 ft.	12.50 to 13.00
Steel rails, rerolling	14.00 to 14.50
Iron rails	12.00 to 12.50
Iron car axles	18.00 to 19.00
Low phosphorus melting	13.00 to 13.50
Cast borings	8.50 to 8.60
Machine shop turnings	7.50 to 7.60
Mixed borings and short turnings	8.50 to 8.60
Compressed steel	9.00 to 9.25
Railroad wrought	12.00 to 12.50
Railroad malleable	12.50 to 13.00
Light bundled sheet stampings	6.00 to 7.00
Steel axle turnings	9.00 to 10.00
No. 1 cast	15.00 to 16.00
No. 1 busheling	8.25 to 8.75
Drop forge flashings, over 10 in.	7.50 to 8.00
Drop forge flashings, under 10 in.	7.50 to 8.00
Railroad grate bars	12.75 to 13.00
Stove plate	13.00 to 13.25
Pipes and flues	8.50 to 9.00

New York

NEW YORK, Dec. 20.

Pig Iron.—After several weeks of very fair activity, the holiday lull has come and nearly all buyers seem to be postponing taking any action until after the new year. The Central Foundry Co., which has been inquiring for 2000 tons, half No. 2X and half No. 2 plain, has not yet placed its order. A Tennessee car works is in the market for 400 tons of high silicon iron. An inquiry concerning which details are not available includes from 3000 to 4000 tons. Prices show no change and there is no disposition to go under the recent very low quotations on iron for delivery into New England.

We quote delivered in the New York district as follows, having added to furnace prices \$2.52 freight from eastern Pennsylvania, \$5.46 from Buffalo and \$6.16 from Virginia:

East. Pa. No. 1 fdv., sil.	2.75	to	3.25	\$22.52	to	\$23.02
East. Pa. No. 2X fdv., sil.	2.25	to	2.75	22.02	to	22.52
2.75	21.52	to	22.52			
East. Pa. No. 2 fdv., sil.	1.75	to	2.25	23.96	to	24.46
Buffalo, sil.	1.75	to	2.25	27.16	to	28.16
No. 2 Virginia, sil.	1.75	to	2.25			

Finished Iron and Steel.—A considerable volume of structural steel business is pending, and while some work may be held back pending the adjustment of wages in the New York building trades, the prospect for continued building activity early in the new year appears fairly bright to fabricators and structural steel companies. One of the largest buildings being

figured on is the proposed office structure for the Equitable Life Assurance Society on Seventh Avenue near the Pennsylvania station; steel requirements will be 9000 tons. A department store building for R. H. Macy & Co., requiring 8000 tons, is also being figured, and a new office building for Pershing Square, Forty-second Street and Fourth Avenue, 5000 tons. The steel required for the stadium for the New York (American League) baseball park will total 3000 to 4000 tons; bids close Dec. 22. The Dravo Contracting Co., Pittsburgh, is low bidder on the South Street bridge, Philadelphia, and the American Bridge Co. will furnish the steel, about 3000 tons. An office building for the Neumont Realty Co. at 49 West Forty-fifth Street, New York, requiring 600 tons, is up for bids; also a Masonic Temple at New Britain, Conn., 300 tons, and another building for Johns Hopkins University, Baltimore, 350 tons. An inquiry for a 500-ton building was mentioned last week. There will be a letting this week by the New Jersey State Highway Commission for work at Fernwood, N. J., 500 tons. The American Bridge Co. has been awarded 350 tons of steel for Public School No. 58, New York. The Paterson Bridge Co. will fabricate 1400 tons for a factory building at 242 West Thirty-sixth Street, New York. Oil tank work continues to figure in current steel lettings. The Humble Oil Co., Baytown, Tex., has let a contract for tanks requiring 2700 tons of plates. The Sinclair Consolidated Oil Corporation has awarded 50 tanks in all to the Chicago Bridge & Iron Works, the steel totaling about 13,000 tons. A part of this work was mentioned in a recent issue as having been awarded. The Thomas Crimmins Contracting Co., which will do a portion of the Catskill aqueduct work, has awarded to the New York Engineering Co., New York, the contract for fabricating 8000 tons of plates into pipe. The steel will be furnished by the Bethlehem Steel Co. from its Sparrows Point plant and transported to Yonkers by water. Fabrication of 2000 tons of plates into pipe for Rice & Ganey, another aqueduct contractor, will be done by the American Bridge Co. These projects are almost the only features of the pre-holiday steel market. Jobbers and consumers of steel are buying very sparingly. Prices are virtually unchanged. Plates, shapes and bars are being quoted at 1.50c., Pittsburgh, but on desirable business this figure is being shaded, particularly on plates and shapes.

We quote for mill shipments, New York, as follows: Soft steel bars, 1.88c.; plates, 1.83c. to 1.98c.; structural shapes, 1.88c. to 1.98c.; bar iron, 1.98c. to 2.03c. On export shipments the freight rate is now 28.5c. per 100 lb. instead of 38c. the domestic rate.

Warehouse Business.—The settled dullness of the market continues. Reports of price shading are still current, but, in general, orders are not sufficiently large or numerous to produce any inclination to make lower prices. There have been offers of black sheets at lower than the prevailing quotation of 4c. per lb. base, and some shading of plate and bar prices. In most instances the middle of January or first of February is felt to be the earliest prospect of any improvement. In accordance with the recent mill reductions in prices of standard steel pipe, warehouses handling this product have reduced quotations about \$5 per ton. The brass and copper market is as dull as iron and steel, but warehouses look forward to considerably better business early in 1922, based upon fairly large orders now on the books for delivery in January, February and March. We quote prices on page 1652.

High-Speed Steel.—The market is dull and although some makers of special brands maintain prices of 90c. to \$1 per lb., prices generally range from 85c. to 95c. per lb. for 18 per cent tungsten high-speed steel.

Cast-Iron Pipe.—The demand for pipe from private companies is greater than normal for this time of year, many shops being booked ahead with orders for two or three months. In going over their books, several makers have discovered that their volume of business has been greater this year than last. Providence, R. I., will open bids Dec. 28 on 600 tons; New Bedford, Mass., will consider bids on 500 tons on Dec. 27; sizes range from 8 to 16 in. for both cities. We quote per net ton, f.o.b. New York, carload lots, as follows: 6-in. and

larger, \$47.30; 4-in. and 5-in., \$52.30; 3-in., \$62.30, with \$4 additional for Class A and gas pipe.

Ferroalloys.—The ferromanganese market is more active both as to sales and inquiries. It is understood that an Ohio consumer has contracted for about 1000 tons for first half delivery at about \$60, delivered, the leading steel producer being credited with the sale. Inquiries from three or four other consumers total about 600 tons. There is no change in the prevailing quotations. There are inquiries for small lots of spiegeleisen, the quotations for which remain firm. An interesting development is the inquiry for several hundred tons for export, the movement being one of the largest in years. There is no demand for manganese ore. While some producers of 50 per cent ferrosilicon continue to quote \$60, delivered, the material can be obtained at concessions considerably below this level, or at \$57 per ton, delivered. Quotations are as follows:

Ferroalloys

Ferromanganese, domestic, delivered, per ton,	\$60.00 to \$63.00
Ferromanganese, British, seaboard, per ton	\$58.35
Spiegeleisen, 20 per cent, furnace, per ton..	\$26.00
Ferrosilicon, 50 per cent, delivered, per ton..	\$57.00
Ferrotungsten, per lb. of contained metal, 40c. to 50c.	
Ferrocromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered, 10c. to 14c.	
Ferrovanadium, per lb. of contained vanadium	\$4.50

Ores

Manganese ore, foreign, per unit, seaboard..	20c.
Tungsten ore, per unit, in 60 per cent concentrates ..	\$2.00 up
Chrome ore, 40 to 45 per cent Cr ₂ O ₃ , crude, per net ton, Atlantic seaboard....	\$20.00 to \$25.00
Chrome ore, 45 to 50 per cent Cr ₂ O ₃ , crude, per net ton, Atlantic seaboard.....	\$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS ₂ , New York.....	45c. to 50c.

Old Material.—The stiffening market on heavy melting steel in the Pittsburgh district has tended to halt the downward march of prices here. Prices are nearly at a standstill, though the tendency is toward a drop. One broker has marked up buying prices of grate bars 50c., offering \$13.50, delivered, Phoenixville. He has marked down on four other items. New York scrap dealers and brokers are not keenly interested in the scrapping of Navy vessels. They believe the supply, so afforded, would not depress the market because of the comparatively small amount of tonnage and the length of time before it would be placed on the market. The market may rise and fall many times before this supply becomes a factor, they say. They also believe that it will be difficult to interest parties in forming a company to dismantle war vessels because of the temporary nature of the business.

Buying prices per gross ton, New York, follow:	
Heavy melting steel, yard.....	\$7.50 to \$8.50
Steel rails, short lengths, or equivalent	8.50 to 9.50
Rerolling rails	9.50 to 10.50
Relaying rails, nominal.....	30.00 to 35.00
Steel car axles.....	10.50 to 11.00
Iron car axles.....	18.50 to 19.50
No. 1 railroad wrought.....	10.50 to 11.00
Wrought iron track.....	8.50 to 9.50
Forge fire	5.00 to 5.50
No. 1 yard wrought, long.....	9.00 to 9.50
Cast borings (clean).....	6.50 to 7.00
Machiné-shop turnings.....	4.00 to 5.00
Mixed borings and turnings.....	4.00 to 4.50
Iron and steel pipe (1 in. diam. not under 2 ft. long).....	6.75 to 7.25
Stove plate	9.00 to 10.00
Locomotive grate bars	9.00 to 10.00
Malleable cast (railroad)	8.00 to 8.50
Car wheels	10.50 to 11.50
Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:	
No. 1 machinery cast.....	\$16.50 to \$17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size.....	15.50 to 16.00
No. 1 heavy cast, not cupola size.....	14.00 to 14.50
No. 2 cast (radiators, cast boilers, etc.)	10.00 to 10.50

Steel Rates Again Suspended

WASHINGTON, Dec. 20.—The Interstate Commerce Commission has further suspended until Feb. 3 the operation of tariff schedules which proposed the cancellation of the existing carload and less than carload commodity rates on iron and steel products from Boston, Chelsea, Davenport, Gloucester, Cambridge, Clinton, Fitchburg and Worcester, Mass., to destinations on the Maine Central Railroad. The schedules indicate the application of class rates.

Philadelphia

PHILADELPHIA, Dec. 20.

The year is drawing to a close with marked weakness in all markets—pig iron, steel products and scrap. In foundry iron there has been a drop of at least 50c. a ton during the week and on a sale of 6000 tons of basic iron the delivered price was about 75c. a ton below that of the last important transaction. In steel products there is not enough business to bring out a general trend toward lower levels, but where tonnages are desirable, Eastern mills have shown no hesitancy in quoting delivered prices which put Pittsburgh base prices out of the reckoning.

Mill operations over the holidays are apt to be somewhat reduced, as the steel companies are finding it difficult to obtain sufficient accumulations of orders for any continuity of rollings. There is a degree of optimism that buying of steel will be better after the turn of the year. Jobbers are known to have worked their stocks to a very low point, and many of them will undoubtedly place new stock orders after inventory. One New York jobber is now inquiring for 3000 to 5000 tons of structural shapes and small angles.

Pig Iron.—Further weakness in pig iron prices has developed within the past week, both foundry and steel-making grades having sold below last week's quotations. An Eastern steel maker has bought 6000 tons of basic, divided equally between two furnaces, at \$20.25, delivered, which represents a decline of 75c. per ton since the last important basic sale. In foundry iron there is marked weakness and prices have eased off for first quarter shipment fully 50c. a ton or more during the week. No. 2 plain iron is to be had, where the tonnages are attractive, at \$19.50, furnace, and No. 2X at \$20 and \$20.50, furnace. No. 1X has been sold at \$21 and \$22, furnace. All sales are not being made at these low prices, some furnaces asking and sometimes obtaining 50c. to \$1 higher, but this usually occurs in cases where the foundryman desires a particular brand to which he has grown accustomed through long use. Low phosphorus, malleable and gray forge grades are inactive and prices quoted are nominal. While the market has not been active during the week, one or two sellers have booked a fair quantity of business. One sales office figures its total in foundry iron sales for the week at 7500 tons. A cast iron pipe company has closed for a total of 5000 tons of No. 2 plain at \$21, delivered, the order being split among three furnaces. There have been a few other good-sized sales.

The following quotations are, with the exception of those on low phosphorus iron for delivery at Philadelphia, and include freight rates varying from 84 cents to \$1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil..	\$20.34 to \$20.76
East. Pa. No. 2X, 2.25 to 2.75 sil....	21.34 to 21.76
Virginia No. 2 plain, 1.75 to 2.25 sil..	27.74 to 28.74
Virginia No. 2X, 2.25 to 2.75 sil....	28.24 to 29.74
Basic deliv. eastern Pa.....	20.25
Gray forge	21.00 to 22.00
Malleable	23.00 to 24.00
Standard low phos. (f.o.b. furnace)	36.50
Copper bearing low phos. (f.o.b. furnace)	35.00

Ferroalloys.—Very little inquiry for ferromanganese has originated recently in the Eastern steelmaking district, but one sale of 1000 tons is reported from Ohio. It is reported that the order went to the Steel Corporation at \$60 a ton, delivered. Spiegeleisen is nominally quoted at \$25 to \$27, furnace, with few sales.

Billets.—While demand for billets is limited, a few sales have been made recently. Prices are weak, \$28, Pittsburgh, having been done by buyers on rerolling quality and \$32, Pittsburgh, on forging quality.

Plates.—Plate mills, if operating at all, continue on a hand-to-mouth basis, seldom knowing what their rolling schedules will be for more than a few days ahead. Some small orders are being placed, but aside from one lot of 8000 tons placed with a Sparrows Point mill for the Catskill aqueduct job, New York, no large tonnages are coming out. Prices are weak, but the situation is complicated by the willingness of Eastern mills to quote f.o.b. mill rather than on a Pittsburgh basis on desirable lots. On a Pittsburgh basis it is

easy now to do 1.45c., and some quotations by Eastern mills, if figured back to Pittsburgh, work out to lower figures than this.

Structural Material.—The Keystone State Construction Co. was low bidder on the foundations for the Philadelphia-Camden bridge, which will require about 1200 tons of shapes, in addition to tonnages of reinforcing bars and sheet steel piling. About 1500 tons of steel will be required for a new Museum of Arts, Philadelphia, on which quotations are now being made. Fabricators are figuring work very closely and in numerous instances are obtaining prices on shapes below 1.50c., Pittsburgh.

Bars.—Makers of bar iron are now quoting 1.50c. to 1.55c., Pittsburgh, and even these prices could be shaded on attractive lots, but such have not been forthcoming. Steel bars are quoted at 1.50c., Pittsburgh, but on reinforcing bars this has been shaded. Very little business is being done and prices are not thoroughly tested.

Sheets.—Despite rumors of shading of prices on sheets, the leading makers say that 2.25c. on blue annealed, 3c. on black and 4c. on galvanized, Pittsburgh base, are fairly firm.

Rails.—No inquiry for rails has come from the Pennsylvania Railroad, but one is expected soon. This road is reported to have scaled down its anticipated requirements for 1922 from 150,000 to 100,000 tons.

Wire Products.—A reduction in the prices of wire nails and other wire products is anticipated by consumers, who have been advised to this effect by one of the leading makers. There has been some shading of \$2.75 per keg on wire nails.

Warehouse Business.—Demand for steel out of stock has continued on an even keel this month, but without improvement over the November sales. Jobbers' stocks are running low and there will be considerable replenishment required after inventory. Prices are unchanged and for Philadelphia delivery are as follows:

Soft steel bars and small shapes, 2.65c.; iron bars (except bands), 2.65c.; round edge iron, 2.80c.; round edge steel, iron finish, $1\frac{1}{2}$ x $\frac{1}{2}$ in., 2.95c.; round edge steel planished, 3.70c.; tank steel plates, $\frac{1}{4}$ -in. and heavier, 2.75c.; tank steel plates, 3/16-in., 2.925c.; blue annealed steel sheets, No. 10 gage, 3.50c.; light black sheets, No. 28 gage, 4c.; galvanized sheets, No. 28 gage, 5c.; square twisted and deformed steel bars, 2.65c.; structural shapes, 2.60c.; diamond pattern plates, $\frac{1}{4}$ -in., 4.60c.; 3/16-in., 4.785c.; $\frac{3}{8}$ -in., 4.90c.; spring steel, 4.10c.; round cold-rolled steel, 3.25c.; squares and hexagons, cold-rolled steel, 3.75c.; steel hoops, No. 13 gage and lighter, 3.50c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.25c.; iron bands, 3.90c.; rails, 2.75c.; tool steel, 8c.; Norway iron, 5c.; toe steel, 4.50c.

Coke.—Furnace coke for first quarter contract delivery is quoted at \$3.10 to \$3.25, Connellsville, but distress furnace coke has been offered within the past few days at \$2.75, Connellsville. Foundry coke is available at \$4, Connellsville.

Old Material.—Demand for scrap has dropped almost to nothing and prices are weak. One Eastern mill came into the market for stove plate and grate bars, but otherwise there has been no buying of moment. This buying immediately strengthened prices of these grades, though other prices remain weak. We quote for delivery to consumers in this district as follows:

No. 1 heavy melting steel	\$11.50 to \$12.50
Scrap rail	11.50 to 12.50
Steel rails, rerolling	16.25 to 16.75
No. 1 low phos. heavy 0.04 and under	17.00 to 18.00
Car wheels	16.50 to 17.00
No. 1 railroad wrought	14.50 to 15.00
No. 1 yard wrought	12.00 to 12.50
No. 1 forge fire	9.50 to 10.00
Bundled sheets (for steel works)	9.50 to 10.00
No. 1 busheling	12.00 to 13.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	9.00 to 9.50
Mixed borings and turnings (for blast furnace use)	9.00 to 9.50
Machine-shop turnings (for rolling mill and steel works use)	9.00 to 9.50
Heavy axle turnings (or equivalent)	9.00 to 9.50
Cast borings (for steel works and rolling mills)	11.50 to 12.00
Cast borings (for chemical plants)	13.50 to 14.00
No. 1 cast	16.50 to 17.00
Railroad grate bars	14.00 to 14.50
Stove plate (for steel plant use)	14.00 to 14.50
Railroad malleable	13.50 to 14.00
Wrought iron and soft steel pipes and tubes (new specifications)	11.50 to 12.00
Iron car axles	No market
Steel car axles	17.00 to 18.00

St. Louis

ST. LOUIS, Dec. 20.

Pig Iron.—An improvement is reported in the demand for pig iron. Sales were better, there were more inquiries and shipping instructions on contracts were heavier. There was no outstanding order or inquiry of consequence, business being largely in carloads and up to 300 tons for immediate or first quarter shipment. The sale is reported of 300 tons of foundry iron to a southern Illinois radiator manufacturer and of considerable tonnage of Lake Superior charcoal iron in this district. A Louisville melter wants 200 tons of foundry iron, and there is an inquiry from a local melter for 200 tons of malleable. The St. Louis Coke & Chemical Co. is now operating its furnace at Granite City, Ill. The market seems fixed now at \$20, Chicago. Inquiries for four carloads of spiegeleisen came from three different concerns and there also was an inquiry for a carload of ferro-manganese.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices \$2.88 freight and war tax from Chicago and \$5.91 from Birmingham:

Northern foundry, stl. 1.75 to 2.25...	\$22.88
Northern malleable, stl. 1.75 to 2.25...	22.88
Basic	22.88
Southern foundry, stl. 1.75 to 2.25...	\$23.41 to 23.91

Coke.—The demand for coke is only moderate, and sales are confined to carload lots, consumers not being disposed to close any big tonnages. The only inquiry of note is for 3000 tons of foundry coke for shipment through the first half of next year. Mild weather has cut the consumption of domestic coke.

Old Material.—The old material market is irregular and spotty. Steel foundry grades, such as couplers, knuckles, springs and solid steel wheels, are stronger, while rolling mill grades are decidedly weaker. Some of the dealers are short on steel specialties, and as the mills in this district are demanding this material, the tendency of these grades is upward. Rerolling rails also are in demand, and this item has advanced 50c. a ton, but relaying rails are slow and very few inquiries are before the market. There are no railroad offerings of consequence this week.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton
Old iron rails.....\$14.50 to \$16.00
Steel rails, rerolling.....13.00 to 13.50
Steel rails, less than 3 ft.....13.00 to 13.50
Rerailing rails, standard section.....23.00 to 28.00
Cast iron car wheels.....15.50 to 16.00
No. 1 heavy railroad melting steel.....11.50 to 12.00
No. 1 heavy shoveling steel.....11.00 to 11.50
Ordinary shoveling steel.....10.50 to 11.00
Frogs, switches and guards cut apart.....11.50 to 12.00
Ordinary bundle sheet.....4.50 to 5.00

Per Net Ton
Heavy axles and tire turnings.....6.00 to 6.50
Iron angle bars.....13.50 to 14.00
Steel angle bars.....10.50 to 11.00
Iron car axles.....20.00 to 21.00
Steel car axles.....14.00 to 14.50
Wrought iron arch bars and transoms.....14.50 to 15.00
No. 1 railroad wrot.....10.00 to 10.50
No. 2 railroad wrot.....9.00 to 9.50
Railroad springs.....12.00 to 12.50
Steel couplers and knuckles.....12.00 to 12.50
Locomotive tires 42 in. and over.....smooth inside.....9.00 to 9.50
.....8.00 to 8.50
.....6.00 to 6.50
No. 1 busheling.....9.50 to 10.00
No. 1 boilers cut in sheets and rings.....7.50 to 8.00
No. 1 railroad cast.....14.00 to 14.50
Stove plate and light cast.....12.00 to 12.50
Railroad malleable.....9.50 to 10.00
Agricultural malleable.....9.00 to 9.50
Pipes and flues.....7.50 to 8.00
Heavy railroad sheet and tank.....6.50 to 7.00
Light railroad sheet.....4.50 to 5.00
Railroad grate bars.....9.50 to 10.00
Machine shop turnings.....5.50 to 6.00
Country mixed iron.....7.50 to 8.00
Uncut railroad mixed.....8.50 to 9.00
Horseshoes.....11.00 to 11.50
Railroad brake shoes.....9.50 to 10.00

Finished Iron and Steel.—The railroad business continues to be the center of interest in the trade here. In addition to the inquiries pending, purchasing agents are busy preparing additional lists of requirements. The Union Pacific has an inquiry out for 20 69-ft. steel baggage cars and 20 70-ft. steel passenger cars. The Wabash wants two steel diners and ten steel coaches. The Missouri Pacific and Missouri, Kansas & Texas each want a carload of plates, and the former road also wants 1000 kegs of track spikes. The market for sheets is firm and full prices are being obtained on the few

sales that are being made here. A fair demand is reported from the South. Some sales of wire rods are being made in this territory, one concern reporting 250 tons within the last two weeks. The demand for structural steel is virtually dead, pending a readjustment of the wage situation.

For stock out of warehouse we quote: Soft steel bars, 2.77½c. per lb.; iron bars, 2.77½c.; structural shapes, 2.87½c.; tank plates, 2.87½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, 4.15c.; cold drawn rounds, shafting and screw stock, 3.65c.; structural rivets, \$3.52½ per 100 lb.; boiler rivets, \$3.65; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 60-10 per cent; small, 60-10 per cent; carriage bolts, large, 55-5 per cent; small, 55 per cent; lag screws, 65-5 per cent; hot pressed nuts, square or hexagon blank, \$4; and tapped, \$3.75 off list.

San Francisco

SAN FRANCISCO, Dec. 7.

Pig Iron.—The tendency to limit operations in foundry work to routine needs, with a consequent curtailment of demand for pig iron, has become more manifest in the past fortnight period. Actual sales, accordingly, have been very few, and principally involving small lots. One large handler reported selling three cars of Belgian material at \$30, ex-ship, San Francisco. The grade was No. 1. In view of present conditions, this price is considered very good, as the general market level is conceded to be somewhat below \$30. Lower grades are still freely offered around \$25, with virtually no takers. There are several prospects around at the moment from certain foundries and machine companies, it being reported that there is some interest in an aggregate of about 1500 tons of Belgian and German iron. No business, however, has resulted yet. Competition is very keen for the few prospects that arise.

Coke.—As has been the case this year, the Southern Pacific Co. provides the chief buying feature in this commodity, that road now being in the market for 600 tons of standard quality domestic coke. It is estimated that from 8 to 10 cars have moved into consumptive channels during the past week or so. There has been noted a slight increase in imports of foreign coke and a fair business has been done at approximately \$21, ex ship, for No. 1 English foundry.

Old Material.—By far the largest and most interesting transaction in the scrap market on the Coast of recent date is the purchase of 5000 tons of heavy melting steel by a big scrap interest. This material came from the old cruisers Marblehead and Minneapolis, and was taken on the basis of \$10 a gross ton, f.o.b. cars, Oakland, which is considered the market price. Otherwise, there is little, if any, change in the scrap situation here, the regular business being done each week. Cast iron material is rather quiet at from \$20 to \$22.

Cast-Iron Pipe.—After a period of relative dullness, municipal demand for pipe shows improvement, and at the same time business from private sources is very satisfactory at present. In spite of this, however, the market has developed a slight softening tendency, the base price now being quoted from \$30 to as high as \$35, although \$33 represents the general top. On Dec. 6 Los Angeles received bids on 1040 tons of 4-in., 800 tons of 6-in. and 57 tons of 8-in. pipe. The city of Sacramento called for bids on Dec. 1 for 42 tons of 6-in. pipe. Anaheim is in the market for 397 tons of 10-in., 31 tons of 12-in. and 7 tons of 6-in. pipe. Alhambra asked bids on Dec. 5 for 30 tons of 4-in., 9 tons of 6-in. and 34 tons of 8-in., and Holtville closed bids to-day for 78 tons of 4-in. pipe.

Finished Iron and Steel.—There is very little to report in the Coast steel market at present. Except for a routine movement of mixed materials, the situation is exceedingly quiet here, and operators are expecting this general condition to prevail until the holiday season is over. Buyers are holding off in view of the inventory period being at hand. An unsettled condition still prevails in prices of plates and sheets, but there is hardly enough actual business being done to establish a reliable idea of values. It appears that galvanized sheets are around 3.75c., Pittsburgh.

British Iron and Steel Market

Galvanized Sheets the One Active Element—Continental Competition in Bars Has Forced a Drastic Cut—Billets Higher

(By Cable)

LONDON, ENGLAND, Dec. 20.

As a substantial drop in railroad freight rates is confidently expected for early in January, the tone of the Cleveland pig iron market is consequently improving, though demand is naturally quiet, owing to the near approach of the Christmas holidays. Fourteen East Coast hematite furnaces are now in blast and prices are weak. Bilbao Rubio is held at 26½s. to 27s. (\$5.56 to \$5.67) ex-ship, Tees.

There is a fair export demand for steel generally, but works managers are anxious for actual orders. Beams have been sold at below £8 (1.50c. per lb.) f.o.b. Prompt rails are quoted at £8 10s. (\$35.70) f.o.b. Guest, Keen & Nettlefolds, Ltd., of Birmingham, is building a new mill for making steel railroad ties.

Tyne shipbuilding output this year has amounted to 373,959 tons gross register. Walter Runciman has purchased a fleet now building on the Tyne, for delivery early in 1922, at about a pre-war price, for Eastern, Australian and Pacific trades.

There is some improvement in sales of Continental material. India has bought German merchant bars at £8 10s. (1.59c. per lb.) c.i.f. German wire rods have been sold to Japan at £8 15s. to £9 (\$36.75 to \$37.80) f.o.b. for February and March delivery. Czechoslovakian merchant bars are being sold at £8 (1.50c. per lb.) f.o.b., for shipment in three to five weeks. Belgian bars are quoted by merchants at £8 12½s. (1.62c. per lb.) c.i.f. India. Luxemburg bars are quoted by the works at £7 10s. (1.41c. per lb.) f.o.b., for shipment in eight weeks. Belgian rails are offered at £9 10s. (\$39.90) delivered in the Midlands. French rounds and squares are offered at £8 5s. (1.55c. per lb.) f.o.b.

Tin plates are depressed on forced liquidation and prices have declined to below cost. Far forward sales are being done at below 20s. (\$4.20) basis f.o.b. Some makers, in consequence, are doubtful of being able to continue rolling. Present Wales output is about 75 per cent. Home trade demand is quiet. Odd sizes are being sold at 20¼s. (\$4.25) f.o.b., for January and February shipment. The Far Eastern demand is stagnant.

Galvanized sheet makers are booking more orders, especially to Indian specifications. Most of the works are full until the end of January. Black sheets are easier.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at \$4.20 per £1 as follows:

Durham coke, delivered...	£1	8 1/2	to £1	10	\$5.98 to \$6.30
Cleveland No. 1 foundry...	5	5	&	5 10*	22.05 & 23.10*
Cleveland No. 3 foundry...	5	0	&	5 5*	21.00 & 22.05*
Cleveland No. 4 foundry...	4	15			19.95
Cleveland No. 4 forge...	4	10			18.90
Hematite	7	0*			29.40*
East Coast mixed.....	5	0	&	5 2 1/2*	21.00 & 21.52*
Ferromanganese	15	0	&	14 10*	63.00 & 60.90*
Rails, 60 lb. and up.....	9	0	to	10 10	37.80 to 44.10
Billets	8	0	to	8 5	33.60 to 34.65
Sheet and tin plate bars,					
Welsh	7	15			32.55
Tin plate base box.....	1	0	to	1 1	4.20 to 4.41 C. per Lb.
Ship plates	9	10	to	10 10	1.78 to 1.97
Boiler plates	14	0	to	14 10	2.62 to 2.72
Tees	10	0	to	11 0	1.87 to 2.06
Channels	9	5	to	10 15	1.73 to 2.02
Beams	8	0	to	10 0	1.50 to 1.87
Round bars, 3/4 to 3 in....	8	10	to	10 0	1.59 to 1.87
Galvanized sheets, 24 g...	17	0			3.19
Black sheets	14	0			2.62
Steel hoops	12	0	&	12 5*	2.25 & 2.30*
Cold rolled steel strip, 20 g.	24	10			4.59

*Export price.

EXPORTS INACTIVE

Japanese Buying a Question of Price—Chinese Blast Furnaces Recently Completed

NEW YORK, Dec. 20.—Although stocks of iron and steel in Japan are now about normal and the economic situation of the country much improved, buying is still largely a question of price. This condition is true, not only of Japan, but of China and other Far Eastern markets. To meet this condition, at least partially, American sellers have evidently shaded quotations in many instances considerably, resulting in a rather wide range between export and domestic prices. A Shanghai buyer, recently inquiring for 1000 tons of Apollo sheets, offered as a price 4.10c. per lb., c.i.f. Shanghai. Heavy tin plate has been obtained at \$5.20 per box of 90 lb., and checkered head, counter-sunk wire nails at \$4 per 100-lb. keg, all c.i.f. Shanghai. This was American material.

South American ports, Mexico, South Africa, Australia and other purchasing markets of iron and steel have largely reduced the heavy stocks of cancelled and surplus material that had accumulated in the early part of this year but the depressed condition of exchange and other factors have prevented any large purchasing as yet. A number of large projects are contemplated by foreign governments. The Argentine Government is considering the construction of about 866 km. (538 miles) of railroad connecting Cordoba and Bahia Blanca. The Rivadavia Oil Co., Buenos Aires, Argentina, has purchased and is still buying equipment for the oil fields in Argentina. Bids were opened this week in New York on an electric or hand-power crane for this company, which is partly government controlled.

A new smelting plant of the Han-Yeh-Ping Co., on the Yangtze River, which was built by Japanese engineers, is reported to be completed and ready for operation. Contracts have been let for the construction of a blast furnace for the Lung-Yen Co., near Peking, according to the Bureau of Foreign and Domestic Commerce, and another furnace is planned at Ching-wangtao.

American Engineering Council to Meet in January

Plans for the development of the work of the Federated American Engineering Societies were under discussion at a series of conferences and meetings held in New York last week. President Mortimer E. Cooley and Executive Secretary L. W. Wallace met with the American Engineering Council's committee on procedure Friday evening, Dec. 16, and with the secretaries of the national founder societies on Saturday evening.

The Washington meeting of the council will be held on Jan. 5 and 6. On Jan. 4 at 2 p.m. the executive board will hold a preliminary session at the Cosmos Club, where the council will meet. The business of the council will include the election of three new officers, two vice-presidents and a treasurer. On the evening of Jan. 5 an informal dinner will be given at the University Club, to which the engineers of Washington will be among those invited. Herbert Hoover has been asked to attend and he has accepted provisionally. Secretary Hoover is to spend the holidays in California and his presence is contingent upon his ability to arrange for his return to the capital by this day. In addition to Secretary Hoover, other prominent speakers are expected to deliver addresses.

On Jan. 6 the council will again meet in business session at 10 a.m., and on the afternoon of that day there will be a meeting of the executive board, the new members of which will be elected by the delegates from the national organizations and the regional areas. Each region will choose one member of the board. Representation of the national societies will be determined by membership, the A. S. M. E., for example, electing five.

At the Washington meeting the work of the past year will be reviewed and plans for the ensuing year

discussed. Among the important reports to be received will be that of the special committee on unemployment. Other leading topics will be industrial waste, National Department of Public Works, Patent Office conditions and licensing. Proposed constitutional changes also will be acted upon.

Carnahan Tin Plate & Steel Co. Changes Ownership

YOUNGSTOWN, OHIO, Dec. 20.—The Carnahan Tin Plate & Sheet Co., Canton, Ohio, producer of coke tin plate, has been purchased by Paul Wick and Lloyd Booth, controlling interests in the Falcon Steel Co., operating an 8-mill sheet plant at Niles, Ohio. The new owners will take possession in January. The Canton property is to be reincorporated as the Falcon Tin Plate Co. and eventually merged with the Niles company.

The original Carnahan plant was created and equipment installed several years ago, but in the meantime has been rebuilt and substantial additions made. The plant has a yearly capacity for about 800,000 base boxes of tin plate. It is well booked ahead, having shared in business placed recently. Mills of the Canton property are convertible, making it possible to roll either tin plate or sheets. When operating normally, it employs about 700 men.

To Sell Ferromanganese Direct

E. J. Lavino & Co., Bullitt Building, Philadelphia, manufacturers of ferromanganese and other ferroalloys, have announced to their trade that after Jan. 1 they will sell direct instead of through brokers, as has been their custom. They will soon open a sales office in Pittsburgh, but definite arrangements have not been completed.

Will Sell "Swede" Iron in New England

The Alan Wood, Iron & Steel Co., Philadelphia, has appointed Arthur Tutein, Inc., Boston, as selling agent for "Swede" pig iron in New England. Park & Williams, Philadelphia, will continue to sell "Swede" iron in the remainder of the Eastern territory.

The Chamber of Commerce of Youngstown, Ohio, is making a bid for light manufacturing plants along the Youngstown & Austintown Railroad, completed Dec. 5 by the New Industries Co. of Youngstown. The company has made available more than 1200 acres, with 40,000 ft. of railroad frontage. This industrial center provides sites for 100 manufacturing plants, each with abundant railroad facilities, supplying full reciprocal switching rights with five trunk line railroads.

The Bethlehem Steel Co., Baltimore, has preliminary plans under way for extensions in its Sparrows Point plant, to be inaugurated as soon as conditions warrant. It is proposed to utilize the plant of the Baltimore Dry Docks & Shipping Co., recently acquired, for another line of iron and steel working, soon to be announced, and shipbuilding operations at what is known as the South Plant will be discontinued.

The Associated Contractors of Massachusetts have gone on record for reduced wages in building trades and have unanimously voted not to allow labor unions to dictate working conditions in 1922. Such action is backed by the Associated Industries of Massachusetts.

The Anderson Iron Works, Marinette, Wis., is enlarging its working force to fill orders for a patented brick conveyor system used largely by brick manufacturers, contractors, etc.

The Bates Machine & Tractor Co., Joliet, Ill., has arranged for a note issue of \$300,000, for general operations, extensions, etc.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	\$0.35	Kansas City	\$0.815
Philadelphia, export	0.265	Kansas City (pipe)	0.71
Baltimore, domestic	0.335	St. Paul	0.665
Baltimore, export	0.255	Omaha	0.815
New York, domestic	0.38	Omaha (pipe)	0.77
New York, export	0.285	Denver	1.35
Boston, domestic	0.415	Denver (wire products)	1.415
Boston, export	0.285	Pacific Coast	1.665
Buffalo	0.295	Pacific Coast, ship plates	1.335
Cleveland	0.24	Birmingham	0.765
Detroit	0.325	Jacksonville, all rail	0.555
Cincinnati	0.325	Jacksonville, rail and water	0.46
Indianapolis	0.345	New Orleans	0.515
Chicago	0.38		
St. Louis	0.475		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, \$1.; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.50c. to 1.60c.

Sheared plates, ¼ in. and heavier, tank quality, 1.50c. to 1.60c.

Wire Products

Wire nails, \$2.75 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of \$1.25 and shorter than 1 in., \$1.75; bright Bessemer and basic wire, \$2.50 per 100 lb.; annealed fence wire, Nos. 6 to 9, \$2.50; galvanized wire, \$2.95; galvanized barbed wire, \$3.40; galvanized fence staples, \$3.40; painted barbed wire, \$2.90; polished fence staples, \$2.90; cement-coated nail's, per count keg, \$2.35; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots; 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts and Nuts

Machine bolts, small, rolled threads, 70, 10 and 5 to 70, 10 and 7½ per cent off list

Machine bolts, small, cut threads, 70 and 5 to 70 and 10 per cent off list

Machine bolts, larger and longer, 65, 10 and 5 to 70 and 10 per cent off list

Carriage bolts, ¾ in. x 6 in.: Smaller and shorter rolled threads,

65, 10 and 10 per cent off list

Cut threads 65 and 10 to 70 per cent off list

Longer and larger sizes 65 and 10 to 70 per cent off list

Lag bolts 70 and 10 to 70, 10 and 5 per cent off list

Plow bolts, Nos. 1, 2 and 3 heads 60 and 10 per cent off list

Other style heads 20 per cent extra

Machine bolts, c.p.c. and t. nuts, ¾ in. x 4 in.: Smaller and shorter 65 and 5 per cent off list

Larger and longer sizes 65 per cent off list

Hot pressed sq. or hex. blank nuts \$5.50 off list

Hot pressed nuts, tapped \$5.00 to \$5.25 off list

C.p.c. and t. sq. or hex. blank nuts \$5.25 off list

Semi-finished hex. nuts: ¼ in. to 9/16 in. inclusive 80, 10 and 10 per cent off list

Small sizes S. A. E. 80, 10, 10 and 10 per cent off list

¾ in. to 1 in. inclusive, U. S. S. and S. A. E. 70, 10, 10 and 10 per cent off list

Stove bolts in packages 80, 10 and 5 per cent off list

Stove bolts in bulk 80, 10 and 7½ per cent off list

Tire bolts 65, 10 and 10 per cent off list

Track bolts, carloads 3.25c. to 3.50c. base

Track bolts, less than carloads 4.25c. to 4.50c.

Upset Square and Hex. Head Cap Screws

½ in. and under 80 and 10 per cent off list

9/16 in. to ¾ in. 80 and 10 per cent off list

Upset Set Screws

½ in. and under 80, 10 and 5 to 85 per cent off list

9/16 in. to ¾ in. 80, 10 and 5 to 85 per cent off list

Milled Square and Hex. Cap Screws

All sizes 75 and 10 per cent off list

Milled Set Screws

All sizes 70, 10 and 10 per cent off list

Rivets

Large structural and ship rivets \$2.25 to \$2.40 base
Large boiler rivets 2.35 to 2.50 base
Small rivets 70, 10 and 5 to 70, 10 and 10 per cent off list

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, \$38; chain rods, \$38; screw stock rods, \$43; rivet and bolt rods and other rods of that character, \$38; high carbon rods, \$45 to \$50, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, \$2.25 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ¾-in. and 7/16-in., \$2.40 base; 5/16-in., \$2.40 base. Boat and barge spikes, \$2.40 to \$2.50 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, \$3.25 to \$3.50 base per 100 lb. Tie plates, \$2 per 100 lb. Angle bars, \$2.40 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., \$9.30 per package; 8-lb. coating, I. C., \$9.60; 15-lb. coating, I. C., \$11.80; 20-lb. coating, I. C., \$13; 25-lb. coating, I. C., \$14.25; 30-lb. coating, I. C., \$15.25; 35-lb. coating, I. C., \$16.25; 40-lb. coating, I. C., \$17.25 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.50c. to 1.60c. from mill. Refined bar iron, 2c. to 2.10c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Steel	Butt Weld		Iron		
	Inches	Black	Galv.	Inches	Black
1/4	54 1/2	28	1/4 to 3/8	+ 3 1/2	+ 22 1/2
1/4 to 5/8	60	33 1/2	1/2	36 1/2	18 1/2
5/8	65	50 1/2	4	42 1/2	27 1/2
3/4	69	56 1/2	1 to 1 1/2	44 1/2	29 1/2
1 to 3	71	58 1/2			

Lap Weld

2	64	51 1/2	2	39 1/2	25 1/2
2 1/2	68	55 1/2	2 1/2 to 6	42 1/2	29 1/2
7 to 8	65	51 1/2	7 to 12	40 1/2	27 1/2
9 to 12	64	50 1/2			

Butt Weld, extra strong, plain ends

1/8	50 1/2	33	1/4 to 3/8	+ 4 1/2	+ 37 1/2
1/4	56	38 1/2	1/2	35 1/2	23 1/2
5/8	62	50 1/2	4	42 1/2	28 1/2
3/4	67	55 1/2	1 to 1 1/2	44 1/2	30 1/2
2 to 3	70	58 1/2			

Lap Weld, extra strong, plain ends

2	62	50 1/2	2	40 1/2	27 1/2
2 1/2	66	54 1/2	2 1/2 to 4	43 1/2	31 1/2
4 1/2	65	53 1/2	4 1/2 to 6	42 1/2	30 1/2
7 to 8	61	47 1/2	7 to 8	35 1/2	23 1/2
9 to 12	55	41 1/2	9 to 12	30 1/2	18 1/2

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2 1/2 per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel	Charcoal Iron
1 3/4 in.	26 1/2
2 to 2 1/4 in.	41
2 1/2 to 3 in.	52
3 1/4 to 13 in.	57

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.	Cents per Lb.
No. 8 and heavier 2.20	Nos. 11 and 12 2.30
Nos. 9 and 10 (base) 2.25	Nos. 13 and 14 2.35

Box Annealed, One Pass Cold Rolled

Cents per Lb.	Cents per Lb.
Nos. 17 to 21 2.80	No. 28 (base) 3.00
Nos. 22 to 24 2.85	No. 29 3.10
Nos. 25 and 26 2.90	No. 30 3.20
No. 27 2.95	

Galvanized

Cents per Lb.	Cents per Lb.
Nos. 10 and 11 3.00	Nos. 25 and 26 3.70
Nos. 12 to 14 3.10	No. 27 3.85
Nos. 15 and 16 3.25	No. 28 (base) 4.00
Nos. 17 to 21 3.40	No. 29 4.25
Nos. 22 to 24 3.55	No. 30 4.50

Tin-Mill Black Plate

Cents per Lb.	Cents per Lb.
Nos. 15 and 16 2.80	No. 28 (base) 3.00
Nos. 17 to 21 2.85	No. 29 3.05
Nos. 22 to 24 2.90	No. 30 3.05
Nos. 25 to 27 2.95	Nos. 30 1/2 and 31 3.10

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

Dec.	Copper, New York	Tin		Lead		Zinc	
		Electro- lytic Lake	New York	New York	St. Louis	New York	St. Louis
14.....	13.75	13.50	33.00	4.70	4.40	5.17½	4.82½
15.....	13.87½	13.62½	33.75	4.70	4.40	5.20	4.85
16.....	13.87½	13.62½	33.75	4.70	4.40	5.20	4.85
17.....	13.87½	13.62½	...	4.70	4.40	5.20	4.85
19.....	13.87½	13.62½	33.00	4.70	4.40	5.22½	4.87½
20.....	13.87½	13.62½	33.00	4.70	4.40	5.25	4.90

New York

NEW YORK, Dec. 20.

Buying in all the markets is moderate, but the price tendency is strong. Actual buying of copper has temporarily slackened, but prices are higher. Moderate activity pervades the tin market with prices higher. Quiet demand at firm prices features the lead market. Prices for zinc have advanced on prospective buying for next year.

Copper.—The electrolytic copper market grows gradually stronger both in demand and prices as the weeks pass. Actual buying for either prompt or future delivery is less active than recently, due largely to the desire of consumers to keep stocks down for inventory purposes, but both actual and prospective demand is of large enough proportions to result in a strong undertone and a slight advance in price. Electrolytic copper for prompt and early delivery is now at a minimum of 13.87½c., delivered, or 13.62½c., refinery, with first quarter at 14c., delivered, and 13.75c., refinery. It is still possible to buy a little January metal at 13.87½c., delivered. The features of the generally quiet market are actual demand for December delivery and large inquiries for January and first quarter which are expected to develop into orders, at least soon after the first of the year. Demand for foreign consumption continues excellent. Active preparations are being made for the more general resumption of mining operations which were drastically curtailed some months ago.

Tin.—The market has been moderately active in a quiet way, with dealers the principal buyers. Consumers, while not actively interested, are carefully following developments. The principal business during the week, outside of that referred to, was done on the New York Metal Exchange. On Dec. 13, 125 tons of Straits tin was sold there, varying from 32.50c. for December-January to February-March shipment from the East to 32.75c. for December shipment. On the following day, Dec. 14, 50 tons of January-February shipment from the East was sold at 33c., with the same price bid for more, sales earlier in the day having been made at 32.87½c. On Dec. 16, 25 tons of January shipment from the East went at 33.50c., with futures at the same price and even down to 33.25c. Yesterday and to-day the market has been quiet, spot selling at 33c., yesterday, with future positions obtainable at the same price. Spot Straits tin was quoted to-day at 33c., New York, and the London market to-day was about £2 per ton higher than a week ago at £171 10s. for spot standard, £173 5s. for future standard and £172 10s. for spot Straits. Arrivals thus far this month have been 2608 tons, with 4215 tons reported afloat.

Lead.—The market continues quiet but firm, with a steady demand for both December and January shipment, the latter being obtainable at December prices. Quotations are unchanged with 4.70c., New York and St. Louis, quoted by the leading interest and with independents asking 4.70c. to 4.75c., New York, and 4.35c. to 4.40c., St. Louis. Scarcity of lead in London continues the feature as well as higher prices, and there are prospects of export shipments to that country in the near future.

Zinc.—Interest in first quarter delivery on the part of consumers is broadening and is the principal factor

in the market, being sufficiently strong to cause a gradual stiffening of prices. Prime Western for early delivery is quoted and has been sold at 4.90c., St. Louis, or 5.25c., New York. For first quarter the quotation ranges from 4.95c. to 5c., St. Louis, moderate sales having been made at the lower level and prospects of 5c. per lb. the minimum before the end of the year. There is an inclination on the part of some consumers to purchase at the 4.90c. level in order to save the 10 points differential ruling for January or first quarter delivery.

Antimony.—The market is quiet and unchanged at 4.50c., New York, duty paid, for wholesale lots for early delivery, with jobbing lots quoted at 4.70c. to 4.90c.

Aluminum.—Wholesale lots of virgin metal, 98 to 99 per cent pure, for early delivery, are quoted by the leading interest at 19c., f.o.b. plant, with the same grade sold by importers at 17c. to 18c., New York, duty paid.

Old Metals.—Business is quiet but values are firm. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible.....	13.25
Copper, heavy and wire.....	12.50
Copper, light and bottoms.....	10.00
Heavy machine composition.....	10.25
Brass, heavy	8.00
Brass, light	6.00
No. 1 red brass or composition turnings.....	8.25
No. 1 yellow rod brass turnings.....	6.25
Lead, heavy	4.25
Lead, tea	3.25
Zinc	3.00

Chicago

DEC. 20.—Following a further advance late last week, tin has reacted and declined below the level of a week ago. Other metal prices remain unchanged and the market is generally quiet. We quote in carload lots: Lake copper, 13.75c.; tin, 34c.; lead, 4.45c.; spelter, 4.95c.; antimony, 6.50c., in less than carload lots. On old metals we quote: Copper wire, crucible shapes and copper clips, 10.25c.; copper bottoms, 8c.; red brass, 8c.; yellow brass, 5.25c.; lead pipe, 3.25c.; zinc, 2.37½c.; pewter, No. 1, 23c.; tin foil, 24c.; block tin, 26c.; all buying prices for less than carload lots.

St. Louis

DEC. 19.—Lead for the week was steady and about unchanged around the 4.40c. level, car lots, while slab zinc was steady at 4.85c. On old metals we quote: Light brass, 3.50c.; heavy red brass and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; pewter, 15c.; tin foil, 16c.; tea lead, 2c.; aluminum, 9c.

A special compilation of industrial accidents in Wisconsin in 1920, issued by the Industrial Commission, shows that 34.4 per cent of all accidents occurred in Milwaukee County. Of the total number reported, namely, 16,246, Milwaukee County is charged with 5580. These figures apply to cases settled under the State Workmen's Compensation Act. The total disbursement by Milwaukee County employers was \$821,830, of which \$189,636 was for medical attention and \$632,194 for indemnity.

Foreign trade of the United States for the ten months of this year, combining imports and exports, was greater with the countries bordering on the Gulf of Mexico and the Caribbean Sea than with all other regions, while Atlantic Europe came second, Atlantic Canada third, and the United Kingdom fourth.

The Texas Heavy Hardware Co. and the Peden Iron & Steel Co., both of Fort Worth, Tex., are perfecting plans for consolidation, to become effective on Jan. 1. E. H. Beall, now president of the first noted company, will become manager of the merged concern.

PERSONAL

George A. Mason, manager of sales wire department, Jones & Laughlin Steel Co., for the past 11 years, has resigned that position, effective Jan. 1, and is retiring from active business.



GEORGE A. MASON

He has been identified actively with the steel and wire business since 1885 when he became affiliated with the H. P. Nail Co., Cleveland, in its sales department. In 1890 he took charge of the Chicago office of that company. In 1900 the H. P. Nail Co. was absorbed by the American Steel & Wire Co. and Mr. Mason went with the latter, being connected with the general sales offices in Chicago. In 1901 he became Kansas City district sales manager of the company and held this position until 1910, when he resigned to become manager of sales of the wire department, Jones & Laughlin Steel Co. He was one of the traveling salesmen who helped to introduce wire nails. This was in the early 80's, prior to which time cut nails monopolized the field. Mr. Mason will remain with the Jones & Laughlin Steel Co. until his successor is thoroughly acquainted with the duties of the position, after which he and Mrs. Mason will do considerable traveling.

E. D. Batchelor, for the past 10 years district sales manager in St. Louis for the Jones & Laughlin Steel Co., has been appointed manager of sales of the company's wire department, to succeed George A. Mason, and will go to Pittsburgh to assume his new duties Jan. 1. Mr. Batchelor has been with the Jones & Laughlin Steel Co. for more than 32 years, having served in several departments in the general offices in Pittsburgh, and for ten years was attached to the Pittsburgh district sales office. Mr. Batchelor is a member of the Chamber of Commerce of St. Louis, Missouri Athletic Club, Algonquin Golf Club, the Sunset Hill Country Club and the Rotary Club of St. Louis.

Frank K. Bull, president J. I. Case Threshing Machine Co., Racine, Wis., has tendered his resignation, effective Dec. 31, and will retire to his estate at Camden, N. C. He is the eldest son of the late Stephen Bull, one of the founders of the Case company, and entered its employ in 1877 at the age of 19 as an apprentice in the repair department. In 1881 he was elected secretary and in 1897, president. Mr. Bull retains his extensive holdings in the company.

E. H. Farrell, formerly general manager Phillip Smith Mfg. Co., Sidney, Ohio, has become Central Western representative of the publication *El Comercio*.

Garrett DeF. Kinney, president Metal Barrel Corporation, Peoria, Ill., was re-elected president of the Steel Barrel Manufacturers' Association at its recent annual convention in Chicago.

Harvey B. Prescott is calling on the northern New Jersey coal consumers for Pilling & Co., iron, steel, ores, coal and coke, 71 Broadway. Until recently he had charge of the Pittsburgh office of W. J. Rainey, Inc.

E. A. Mayhew, formerly chief engineer Damascus Brake Beam Co., Cleveland, and more recently plant engineer of the Ohio Body & Blower Corporation, Cleveland, has been appointed assistant mechanical engineer of the Great Northern Railroad, with headquarters at St. Paul.

John J. Murray, for more than four years in the New York district sales office of the Morgan Engineering Co., at 120 Broadway, is now associated with K. I. Clisby & Co., 233 Broadway, New York, representatives of the Ohio Electric Controller & Mfg. Co., Atlas Car & Mfg. Co., Cincinnati Tool & Lathe Co., R. S. Newbold & Sons Co., Alfred Box & Co. and the Magnetic Mfg. Co., Milwaukee. Mr. Murray will handle sales of Box cranes.

George Darris, general manager Gilbert & Barker Furnace Co., Springfield, Mass., is to speak on coal, gas and oil fuel, at a meeting of the American Society for Steel Treating at the rooms of the Providence Engineering Society, Providence, R. I., on Jan. 4.

Albert U. Widman has been promoted to the position of manager of manufacturing of the Cadillac Motor Car Co., Detroit. He succeeds George H. Laying, who was vice-president in charge of manufacturing for the Cadillac company. Mr. Laying goes to take up similar duties with the Peerless Motor Car Co. of Cleveland.

J. M. Robinson, Peoria, Ill., has been elected president of the U. S. Tractor & Machinery Co., Menasha, Wis., and assumed his new duties Dec. 15.

W. C. Minier resigned as Pittsburgh district sales manager of the Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., effective Jan. 1. His successor is N. P. Farrar, formerly Baltimore district manager of the company.

Carl A. Johnson, president Gisholt Machine Co., Madison, Wis., was re-elected president of the Wisconsin Manufacturers' Association at the annual meeting in Milwaukee, Dec. 15 and 16. Judson C. Rosebush, Appleton, Wis., was elected vice-president, and George B. Ingersoll, general manager Fairbanks, Morse & Co., Beloit, Wis., treasurer. George F. Kull, Madison, Wis., was re-elected secretary and executive director.

Hiram Winternitz, formerly with H. P. Pearl & Co., scrap dealers and brokers, Widener Building, Philadelphia, has become associated with George S. Gates in the management of the Philadelphia office of Charles Dreifus & Co., scrap dealers, Pittsburgh.

William Frank Uhl, formerly of the engineering department of the Allis-Chalmers Mfg. Co., and now of Chas. T. Main Co., Boston, will address the Providence section of the American Institute of Electrical Engineers on the evening of Jan. 3 at the rooms of the Providence Engineering Society, Providence, on hydroelectric development for the Belgian Congo.



E. D. BATCHELOR

Meeting of Labor Legislation Association

The annual meeting of the American Association for Labor Legislation, which will be held at the William Penn Hotel, Pittsburgh, Dec. 27, 28 and 29, will devote itself to the labor problem in the morning of Dec. 28, to business forecasting on the afternoon of that day and to unemployment on the evening of that day. On Dec. 29 industrial accidents will be considered in the morning and the annual business meeting will occur at luncheon. In the afternoon one of the mills of the United States Steel Corporation is to be visited. Thomas L. Chadbourne is president, and Dr. John B. Andrews, 131 East Twenty-third Street, New York, is secretary.

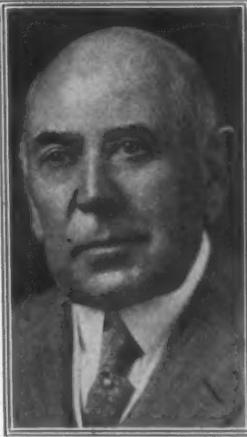
The Public Service Corporation of New Jersey, Newark, has arranged for a bond issue of \$10,000,000, for general operation of electric and other utilities, extensions, etc. Thomas N. McCarter is president.

OBITUARY

JOHN BINDLEY, chairman Pittsburgh Steel Co., Pittsburgh, and for more than 50 years identified with the hardware and steel industries, died at his winter home, El Jardine, Miami, Fla., Dec. 16, death being due to disabilities of age. Prior to becoming chairman of the company, Mr. Bindley had been its president, having been elected in March, 1919, to succeed the late Wallace H. Rowe. He was born in Pittsburgh 75 years ago and had always lived in that city, his larger interests always having been centered in the Pittsburgh district. At the age of 16 he entered the employment of John England, who conducted a hardware store and file factory in Liberty Street, near Ninth Street. Upon reaching his majority, he became a partner in the business, under the firm name of John England & Co., which later was changed to England & Bindley. A few years later Mr. Bindley purchased the interest of Mr. England, and the firm name was changed to the Bindley Hardware Co. The company was liquidated in 1910. While engaged in the hardware business, he became interested in manufacturing, first in the Neely Nut & Bolt Co., of which he was president at the time of his death, and in 1901 in the Pittsburgh Steel Co., of which he was one of the organizers and an original director. Upon the death of his brother, Edwin Bindley, in 1906, he succeeded him as vice-president of that company. He was also one of the organizers and a director of the Pittsburgh Steel Products Co. For many years he had been connected with the Duquesne National Bank, of which he was president at the time of his death. He was also a vice-president of the Dollar Savings Bank, Pittsburgh, and a trustee of the Allegheny Cemetery. Mr. Bindley served several terms as president of the Pittsburgh Chamber of Commerce, and was a former president of the National Hardware Association. He is survived by one son, Edward H. Bindley, and a daughter, Mrs. George Davidson, Los Angeles, and three grandsons, also a sister, Mrs. Mary B. McMillin, Pittsburgh. He was a member of the following clubs: Duquesne, Union, Oakmont Country, Pittsburgh Country, Pittsburgh Golf and Pittsburgh Athletic Association, Pittsburgh; Bankers' Club of Pittsburgh, Automobile Club of Pittsburgh, Bankers' Club of America, Automobile Club of America, New York Yacht Club, Biscayne Bay Yacht Club and Miami Motor Club.

JOHN WHEELER DUNTLEY, founder Chicago Pneumatic Tool Co., was killed by an automobile truck in Chicago on Dec. 15. Mr. Duntley was one of the first to bring into use the pneumatic tool, working with Charles M. Schwab to place it on the market. He began his career as a foundryman and established the Chicago Pneumatic Tool Co. in 1884. He was president of that company until 1909, and at the time of his death was head of the Duntley Automobile Accessories Co., Chicago. He was 55 years of age.

JOHN W. ROELKER, for more than 30 years a valued and trusted executive of B. F. Avery & Sons, Louisville, Ky., died at the home of his daughter in Joliet, Ill., on Dec. 14. He was born in Cincinnati in 1849, and was for many years engaged in the manufacture of plows at Evansville, Ind. During his long service as head of the purchasing department of B. F. Avery & Sons, he enjoyed an extensive acquaintance among manufacturers of supplies. He had been in failing health for several years and retired from active business in



JOHN BINDLEY

January, 1921. He is survived by three sons and a daughter.

ARTHUR JONES, secretary William Pattison Supply Co., Cleveland, machinery dealer, since the organization of that company 24 years ago, died Dec. 14, aged 46 years. He had been in poor health for several years.

RICHARD W. FROHWEIN, secretary and purchasing agent M. H. Treadwell Co., engineers, New York, died at his home in Elizabeth, N. J., Dec. 14. He had been confined to his bed since Thanksgiving Day, suffering from ptomaine poisoning. He had been associated with this company for about 18 years, and was 38 years old when he died.

REUBEN L. LINDSTROM, superintendent Point St. Charles plant, Canadian Steel Foundries, Ltd., died Dec. 12 at his home in Montreal. He left the Bettendorf Co., Bettendorf, Iowa, four years ago, to become metallurgist with the Canadian Steel Foundries, Ltd., which position he filled until appointed to this last position 18 months ago.

Repairing Canadian Cars

TORONTO, Dec. 20.—Within the past week or two several large-sized contracts have been placed with Canadian concerns for car repair work by the various railroads. The Canadian Car & Foundry Co. has secured a contract for repairing 2000 cars for the Canadian National Railways, half of which will be done at the Fort William, Ont., plant and the rest at the Montreal, Que., and Amherst, N. S., works. The National Steel Car Co., Hamilton, Ont., reports a large amount of business on hand. The Lehigh Valley Railway Co. has let a contract to the National Steel Car Co. for repairing 1000 cars. The C. N. R. has placed a tentative order for the repair of 500 cars, and 2000 for the Grand Trunk. It is reported that there is enough business to be done on the repairing of cars in the Dominion to guarantee two years of activity for all car repair shops of the Dominion.

Amalgamated Members Enjoined

A temporary injunction has been issued by the U. S. District Court at Covington, Ky., restraining members of the Amalgamated Association of Iron, Steel and Tin Workers from interfering with the employees of the Newport Rolling Mill Co., Newport, Ky. The claim of the company was that employees were interfered with while delivering materials from their warehouses to points in Kentucky and Ohio. No agreement has yet been reached regarding working conditions and wages at this plant, but the company officials state that about half of their old employees are ready to come back to work at the propositions made to them. It is expected that the mills will resume operations shortly after the first of the year.

Rates Declared Unreasonable

WASHINGTON, Dec. 20.—Recommendation has been made by Attorney Examiner Charles F. Gerry that the Interstate Commerce Commission condemn as unjust and unreasonable the legally applicable car demurrage charges collected at New York and Philadelphia on car-load shipments of steel plates for export in the period from June 1 to Sept. 30, 1920, the report covering complaints of A. G. Kidston & Co., and Hawthorne & Co., Ltd., against the Delaware, Lackawanna & Western, Pennsylvania, et al. Hawthorne & Co. are shipbuilders of Leith, Scotland.

The Cadillac Motor Car Co., Detroit, this month will distribute 81 gold and 247 silver medals to employees. The gold medals are for employees in the company's service for 10 consecutive years, and the silver medals for those in service five years. This will be the first distribution of medals since 1917. Eighteen women workers are eligible to medals, but will receive rings, four of gold and 14 of silver.

Celebration of 80th Birthday of U. T. Hungerford

U. T. Hungerford, president U. T. Hungerford Brass & Copper Co., New York, was the guest of honor at a dinner given by Bernard Ris, secretary of the company, and attended by friends prominently identified with the copper industry, at Hotel Biltmore, New York, Dec. 14, in celebration of his eightieth birthday. The arrangements for the event were elaborate and were carried out in a delightful manner. Mr. Hungerford is still vigorous and is found in his office every day. Each guest was presented a cartoon of himself and an excellent photograph of Mr. Hungerford.

Mr. Hungerford was born in Torrington, Conn., Dec. 14, 1841, one of 12 children of John and Charlotte Austin Hungerford. He comes from New England stock dating back to 1639. The name has been intimately associated with the brass industry in Connecticut where his father, John Hungerford, in 1834 built the first brass mill in Torrington.

In 1865 he became associated with Wallace & Sons Brass and Copper Rolling Mills, Ansonia, Conn., acting as their New York representative and manager until 1895, when he established the U. T. Hungerford Brass & Copper Co. He is also president of the Hungerford Securities Corporation, founder of the Hallenbeck-Hungerford Realty Corporation, and other companies in the copper and allied industries. Endowed with a rugged constitution and generously equipped with mental attainments, Mr. Hungerford's capacity for work seems almost inexhaustible. Although residing at Briarcliff, N. Y., it is rare indeed that he misses his daily visits to the company over which he presides and maintains a close supervision over all its activities.

Mr. Hungerford has always maintained an active interest in the place of his birth and on May 28, 1917, presented to the town the large and completely equipped Charlotte Hungerford Hospital in memory of his mother.

Those who attended the dinner were:

New York: U. T. Hungerford; H. H. Powell, president Importers' and Traders' National Bank; M. S. Lott, Lincoln Trust Co.; Lewis E. Pierson, chairman Irving National Bank; Willard H. Platt, president Greene, Tweed & Co.; Alfred D. Clinch, Underhill, Clinch & Co.; Edward Stagg, Patterson Brothers; Russel A. Cowles, president Ansonia Clock Co.; B. Lissberger, B. Lissberger & Co.; A. L. Salt, vice-president Western Electric Co.; Thomas B. Kent, vice-president American Brass Co.; M. H. Crego, Phelps-Dodge Corporation; W. A. Locke, Taunton-New Bedford Copper Co.; J. W. Taussig; E. F. Byrne; Joseph Clendenin, vice-president Guggenheim Bros.; Edward Savage, Guggenheim Bros.; W. A. Willis, Copper and Brass Research Association; W. S. Eckert, Copper and Brass Research Association; George Smart, editor THE IRON AGE; J. H. Kennedy, editor *Hardware Dealers' Magazine*; L. R. Conklin; J. R. Van Brunt; C. H. Krueger, Bernard Ris; Kenneth B. Ris; George Ris; George C. St. John; E. H. Madison; A. H. Dodd; W. J. Conroy, A. P. Swoyer.

Taunton, Mass.: H. F. Bassett, president Taunton-New Bedford Copper Co.

New Britain, Conn.: W. C. Hungerford.

Detroit: L. H. Jones, president Detroit Copper & Brass Rolling Mills.

Kenosha, Wis.: C. J. Hackett.

Philadelphia: G. W. Heyser, U. T. Hungerford Brass & Copper Co.

Baltimore: A. F. Miller, U. T. Hungerford Brass & Copper Co.

Boston: F. H. Barton, U. T. Hungerford Brass & Copper Co.

Ansonia, Conn.: Charles F. Brooker, chairman American Brass Co.; W. A. Cowles, vice-president American Brass Co.; H. Mitchell Wallace, Roy S. Wildman; Arthur S. Brown.

Waterbury, Conn.: E. L. Frisbie, vice-president American Brass Co.; Gordon W. Burnham, secretary American Brass Co.; A. M. Dickinson; Franklin E. Weaver; John



U. T. HUNGERFORD

A. Coe, Jr., president American Brass Co.; H. T. Montague; H. M. Steele; John P. Elton, treasurer American Brass Co.; Charles Hungerford; W. H. Bassett. Torrington, Conn.: F. L. Braman; Robert Swayze; James A. Doughty. Rome, N. Y.: Barton Haselton, vice-president Rome Brass & Copper Co.; H. J. Rowland, general sales manager Rome Brass & Copper Co. Buffalo: George H. Allen; Joseph J. Lockwood.

Will Co-operate with Department of Commerce

WASHINGTON, Dec. 20.—On the invitation of Secretary of Commerce Hoover, President Edgerton, of the National Association of Manufacturers, has named an advisory committee of manufacturers representing different lines of industry to co-operate with the Department of Commerce and to afford an agency for co-ordinating the work of committees and trade associations which are concerned with the particular problems of their trade, and to be of service to industry and the Department of Commerce in problems of common interest, both to industry and the Government departments. Some of the associations may not be able to co-operate or continue to function in any way owing to the Supreme Court decision in the hardwood case.

As pointed out by Secretary Hoover in his conference with the committee, on Dec. 2, one of the important problems to which the committee will give immediate consideration is the matter of reorganization of government departments, with a view to bringing to various lines of industry the importance of this subject and the need for prompt legislation relating to the question.

Among the committees selected to co-operate with the Department of Commerce are the following:

Iron and Steel: D. A. Burt, La Belle Iron Works, Steubenville, Ohio; J. H. Frantz, American Rolling Mill Co., Middletown, Ohio.

Electric Furnace Products: A. Cressy Morrison, Electro Metallurgical Co., New York, who is chairman of the committee.

Agricultural Machinery: Findley P. Mount, Advance-Rumely Co., Chicago.

Automobiles: J. Walter Drake, Hupp Motor Car Corporation, Detroit.

Electrical Machinery: C. N. Wheeler, Crocker-Wheeler Co., Ampere, N. J.

The following are among the trade association committees of co-operation, selected by trade associations:

Iron and Steel: American Iron and Steel Institute, 61 Broadway, New York; National Founders' Association, 29 South La Salle Street, Chicago; National Association of Tin Plate Manufacturers, Oliver Building, Pittsburgh; Steel Barrel Manufacturers, 855 Leader Building, Cleveland; Bolt, Nut and Rivet Institute, Oliver Building, Pittsburgh; Eastern Bar Iron Institute, 103 Park Avenue, New York; Hydraulic Society (pumps), 50 Church Street, New York.

Agricultural Implements: National Association of Farm Equipment Manufacturers, 72 West Adams Street, Chicago.

Electrical Products: Electrical Manufacturers' Council, 522 Fifth Avenue, New York.

At the annual meeting of the Engineers' Club of Cincinnati on Dec. 15, Frank L. Raschig, Edgar K. Ruth and Charles Paquette were elected directors for a three year period. The meeting was the largest ever held by the club, 250 members being present. John Harrington of New York, vice-president of the American Society of Mechanical Engineers, was the principal speaker at the dinner. He urged the members to take a more active interest in civic affairs. The officers of the club will be elected at a meeting of the directors to be held shortly.

As a mark of courtesy, the Chamber of Commerce of Niles, Ohio, arranged to send a delegation Dec. 21 to visit Joseph G. Butler, Jr., at his residence, 525 Wick Avenue, Youngstown, on the occasion of his 81st birthday. Mr. Butler was born Dec. 21, 1840, in Temperance Furnace, Mercer county, Pa. For many years he has been prominently identified with the iron and steel industry of the Mahoning Valley.

Machinery Markets and News of the Works

ENGINE BUILDER BUYS

American Locomotive Co. Places Orders Totaling About \$40,000

Otherwise Machine-Tool Markets Are Quiet—Prospective Purchases Held Up Until After Jan. 1

The American Locomotive Co., New York, last week closed for about \$40,000 worth of machine tools for its Schenectady works. The machines are for the manufacture of mechanical stokers. The quickness with which this business was negotiated—the inquiry having been issued about Dec. 1—was in contrast to the usual dilatory methods employed by buyers throughout this year.

While considerable railroad business is pending, it

is unlikely that orders will be placed until after Jan. 1, except possibly in the case of the Delaware, Lackawanna & Western Railroad, which is understood to be ready to buy against its recent list. At Chicago the Santa Fe and Rock Island requirements are still pending. The Chesapeake & Ohio, which took bids recently on about \$100,000 worth of shop tools, has as yet done no buying.

The Seaboard Air Line has issued a small list, which includes two turret lathes. The Pennsylvania Railroad is at work on its 1922 list of tool requirements, and it is expected that the inquiries will be sent out soon.

Buying for vocational training schools continues. Indianapolis has bought about \$20,000 worth of tools for a high school and South Bend, Ind., is getting figures on several lathes and other tools for a school.

It is reported from Chicago that the Johns-Manville Co., New York, has revived an old list of tools for its Waukegan, Ill., factory.

New York

NEW YORK, Dec. 17.

The American Locomotive Co., New York, last week placed orders for machine tools totaling \$40,000 or more, the equipment to be used in the manufacture of locomotive stokers at its Schenectady plant. The inquiry for the tools was issued about Dec. 1 and the placing of orders followed much more quickly than has been usual in this year of business hesitation. The orders were split up among a number of manufacturers and dealers.

The Delaware, Lackawanna & Western Railroad, which inquired in October for about 40 machines, is reported to have decided to buy and orders are expected soon.

Otherwise the local machine-tool market is quiet, with fewer inquiries and orders this month than in November. Indications point to some improvement after Jan. 1.

The crane market shows no improvement. Although a few small orders have been placed, there is evidence that good business will develop early in 1922. A locomotive crane is about to be purchased by the Ulen Contracting Co., Allaben, N. Y. An inquiry is in the market through Japanese exporters, including the China-Japan Trading Co., 110 William Street, New York, calling for quotations on three 50-ton and three 75-ton, 65, 70, 75-ft. span overhead traveling cranes for Japan. Only two will be purchased, the others being alternates. The Passaic Valley Sewage Commission, 128 Market Street, Newark, N. J., is receiving bids on a construction contract involving another 15-ton hand power crane. One of the bidders is George B. Spearin, 90 West Street, New York.

The Dirección General Explotación del Troleo de Comodoro Rivadavia, 50 Church Street, New York, opened bids Dec. 20, on a 10-ton, 31-ft. span electric crane with an alternate hand power crane. The Pawling & Harnischfeger Co., was low on the electric crane and the Northern Engineering Works low on the hand power crane.

Among recent sales are: Pawling & Harnischfeger Co., a 5-ton overhead traveling crane to William Bradley & Sons, Long Island City, New York; Shepard Electric Crane & Hoist Co., 10-ton electric hoist to the Union Machine Co., Fitchburg, Mass.; Sprague Electric Works, a 3-ton and a 5-ton, 20-ft. span, one motor crane and two 1-ton monorail hoists to the Driver-Harris Co., Harrison, N. J.; Champion Engineering Co., a 5-ton, 55-ft. 8-in. span overhead traveling crane to the Pittsburgh Valve, Foundry & Construction Co., Pittsburgh.

Reginald Steel, Long Island City, manufacturer of heavy drop forgings, etc., has acquired about 15,000 sq. ft. on Vernon Avenue for a new plant for the production of marine and architectural iron products. Plans will be drawn at once.

The Queens Borough Gas & Electric Co., Far Rockaway, L. I., will make extensions and improvements in its electric power plant on Clifton Street, estimated to cost about \$25,000.

Alexander Pelli & Co., New York, operating a marble and stone works at 509 East 120th Street, will soon take bids for a new plant, 105 x 270 ft., at Elmhurst, L. I., to include marble handling equipment, finishing machinery, etc. L. P. Fluhrer, 280 Madison Avenue, New York, is architect.

Electric motors and other equipment will be installed in the four-story plant to be erected on Washington Avenue, Long Island City, by the National Printing & Engraving Co., 136 West Fifty-second Street, New York, estimated to cost \$400,000.

F. M. Schildwachter, 4130 Park Avenue, New York, is having plans prepared for a four-story ice-manufacturing plant, 76 x 110 ft., on Webster Avenue to cost close to \$1,000,000, including machinery. Koch & Wagner, 32 Court Street, Brooklyn, are architects.

The Enterprise Tinware Co., Inc., 1425 Avenue A, New York, has leased the three-story building, 100 x 100 ft., at 426-32 East Ninety-first Street for extensions. Improvements will be made.

The New York Edison Co., 30 East Fifteenth Street, New York, is having plans prepared for a one-story power house, 50 x 100 ft., at Park Avenue and 168th Street. William Whitehill, 12 Elm Street, is architect.

The State Ice Mfg. Co., care of Alexander Brociner, 110 West Fortieth Street, New York, engineer, will commence the immediate erection of a two-story ice-manufacturing plant, 100 x 200 ft., at Stanton and Tompkins streets, estimated to cost \$100,000, including machinery. Contract has been let to the Eastern Construction Co., 110 West Fortieth Street.

The U-Need Ice Co., 2150 Amsterdam Avenue, New York, will commence the immediate erection of a two-story ice-manufacturing plant, 158 x 215 ft., at Inwood and Mt. Eden avenues, estimated to cost \$175,000 with machinery. Felix D'Allesandro is president.

The new two-story plant to be erected by the Bronx Equipment Co., Concord Avenue and 143rd Street, New York, at Pittsburgh, will be used for the manufacture of automobile bodies. It will cost about \$185,000. C. H. Comstock, 110 West Fortieth Street, New York, is architect.

The Thomas Wright Co., 71 Colden Street, Jersey City, N. J., manufacturer of wagons, parts, etc., is having revised plans prepared for a one-story addition, 100 x 100 ft., estimated to cost about \$27,000. Robert Shannon, 1 Bernius Court, is architect.

A vocational department will be installed in the new high school to be constructed by the Board of Education, Palmyra, N. J. Plans have been drawn.

The Driver-Harris Co., Middlesex Street, Harrison, N. J., manufacturer of electrical and other wire products, has filed plans for a new one-story building to cost about \$10,000. Work is under way on a new rolling mill, 100 x 275 ft.

A vocational department will be installed in the high school addition to be erected by the Board of Education, East Orange, N. J., to cost about \$200,000. Guibert & Betelle, 546 Broad Street, Newark, are architects.

Freight handling machinery will be installed at the proposed municipal piers and warehouses to be constructed by the Board of Aldermen, Perth Amboy, N. J. Preliminary details are being considered and bonds will be provided for the project.

The Ivers-Lee Co., 38 Littleton Avenue, Newark, manufacturer of automatic packing machinery, has leased the second floor of the building at Central Avenue and Lock Street, totaling about 26,000 sq. ft. of space, where it will remove its plant shortly after the first of the year. Extensions will be made in different operating departments to provide for the manufacture of all machine parts and equipment, considerable of which, heretofore, have been produced in outside shops. All parts will be manufactured with the exception of electrical equipment and motors.

A vocational department will be installed in the three-story high school, 200 x 300 ft., to be erected by the Board of Education, Bayonne, N. J., at Avenue A, Twenty-seventh to Twenty-ninth streets, estimated to cost approximately \$450,000. D. G. Anderson, 472 Broadway, is architect.

The Bates Mfg. Co., Lakeside Avenue, West Orange, N. J., manufacturer of numbering machines, will use two of the three floors of the factory at 33 North Day Street, Orange, recently acquired, and for a time will lease the third floor to other interests. The building aggregates about 15,000 sq. ft. of space. The company has passed from the control of Thomas A. Edison, Inc., after about 25 years of operation. It is headed by C. S. A. Williams, president and treasurer, and Stanley M. Babson, vice-president, for about 10 years past connected with the National Lead Co.

Philadelphia

PHILADELPHIA, Dec. 19.

The Hamilton R. Marsh Corporation, 210 South Eleventh Street, Philadelphia, manufacturer of printers' machinery and parts, has leased the first floor of the factory at Eleventh and Race streets for immediate occupancy.

The Keystone Lantern Co., Tacony and Cottman streets, Philadelphia, has filed plans for the erection of a one-story addition.

The Walton Auto Supplies, Inc., 754 South Broad Street, Philadelphia, has awarded contract to T. J. & J. R. Whelan, 1011 Chestnut Street, for a three-story repair works and service building, 80 x 100 ft., at Broad and Bainbridge streets.

The Mackin Motors, Inc., Philadelphia, has leased the two-story building at 855 Broad Street for an automobile service and repair works.

The William Amer Co., 452 North Third Street, Philadelphia, will build a one-story power house on Willow street.

Jacob G. Troescher, 1706-8 West Venango Street, Philadelphia, operating a general machine works, has filed plans for a one-story addition.

Electric motors and other power equipment will be installed in the two-story addition, 75 x 200 ft., to be erected by the Lester Piano Co., 1306 Chestnut Street, Philadelphia, at Lester, Pa., estimated to cost about \$35,000.

Edward R. Huddy, Cass Street, Trenton, N. J., manufacturer of sheet metal, etc., has purchased property, 100 x 100 ft., at Lexington Avenue and Coates Street, for two one-story buildings, each 40 x 100 ft., estimated to cost about \$25,000. The present works will be removed to the new location.

The State Highway Department, Trenton, N. J., is taking bids until Dec. 27 for a one-story automobile service and repair building, 100 x 400 ft., on Scotch Road, Fernwood, for State automobiles and trucks, estimated to cost about \$150,000. R. J. Wasser, Broad Street Bank Building, is State engineer for the Department.

The Borough Council, Lansdale, Pa., is considering plans for the expenditure of about \$250,000 for an addition to the municipal electric power plant and installation of new machinery.

The General Gas & Electric Co., Hanover, Pa., manufacturer of lighting equipment and other electrical products, will establish a new plant, to replace its former works recently sold to the Hanover Motor Car Co. Additional machinery will be installed.

J. A. Rudy, 1808 Derry Street, Harrisburg, Pa., manufacturer of skid treads known as Caterpillar treads, is planning for enlargements in his plant and the installation of new machinery. Following the dissolution of the partnership of Brackney & Rudy, recently arranged, other features of the business, including automobile repair work, etc., will be discontinued.

The Board of Education, Harrisburg, Pa., will receive bids

until Jan. 6 for the construction of vocational shop units at the new senior co-educational high school at Third and Division streets. A power house will also be erected. D. D. Hammelbaugh is secretary.

The Easton Auto Co., Third and Snyder streets, Easton, Pa., has foundation work under way for a new one-story service and repair building, 65 x 150 ft., estimated to cost about \$75,000 with equipment.

The Dunlap & Jones Foundry Co., Pottsville, Pa., has completed the rebuilding of its foundry, destroyed by fire several months ago, and will place the new structure in service immediately.

New England

BOSTON, Dec. 19.

New England machine-tool dealers have put through very little business the past week. The few sales largely concern lathes and include a 16-in. x 8-ft. to a local garage to replace another lathe, a 9-in. x 3-ft. to a manufacturer of woolen fabrics, a used 18-in. x 9-ft. and another 14-in. x 6-ft. to a Pawtucket, R. I., manufacturer, and a 36-in. x 22-ft. lathe to a New York State paper maker, the latter tool passing through two brokers' hands.

There is, however, considerable business pending which has indications of closing soon, including a list put out by a Massachusetts textile interest and numerous individual tools. The list includes one 200-lb. power hammer, one 28-in. upright drill, a sensitive drill, 30-in. planer, 30-in. gear cutter, centering machine, keyseater, wet tool grinder, speed lathe, 1½-in. bolt cutter, 20-in. shaper, power hack saw, two 14-in. lathes, one 18-in. and one 36-in. lathes, universal tool grinder and one No. 2 universal milling machine. Included in the individual tools are a new No. 11 Brown & Sharpe cylindrical grinder wanted by the Waterhouse Welding Co., Boston; a small bench drill for the Northern Industrial Co., South Boston, and one 18-in. x 8-ft. double back geared lathe required by the Boston Elevated Railway. A Massachusetts manufacturer of cutlery is considering the purchase of special milling or slotting equipment. In addition, some crane business is anticipated within a few days.

While quiet conditions are looked for the remainder of the year, dealers are hopeful of early 1922 business. The last few days have been featured by prospective buyers sounding the market on lathes, pipe machines, milling machines, upright drills and shapers, with a view to making purchases shortly after inventory taking is out of the way. In some instances buyers find it difficult to find just what they want and in such cases dealers are looking elsewhere for supplies, having the assurance that the tools will be taken if they can be found. Prices on both new and used machines still favor the buyer.

Plans are being prepared by Monks & Johnson, Boston, engineers, for a group of five manufacturing buildings to be erected for the Mason & Hamlin Piano Co., Boston, at Broadway and Third Street, Cambridge, Mass.

The Segal Metal Products Co., New York, locks and other hardware specialties, has purchased the foundry of Conrad A. Lund, Springdale, Conn., where it is expected a new plant will eventually be erected.

The H. L. Judd Co., Wallingford, Conn., small metal products, is having plans prepared by Lockwood, Greene & Co., Boston, for a five-story building to add to its manufacturing facilities. Plans call for the completion of the structure by July 1.

The Rufus Crowell Co., 2 Somerville Avenue, Somerville, Mass., engineer, is considering the erection of a plant in Cambridge, Mass. Details have not yet been worked out.

The Rumford Press is erecting a four-story 80 x 180 ft. plant, at Concord, N. H.

The finishing, tool and machine shops of the New England Tank & Tower Co., Everett, Mass., were badly damaged by fire last week.

The Fitzgerald Forging & Heat Treating Co., Springfield, Mass., recently organized as a partnership by M. V. and T. J. Fitzgerald, will operate a plant at 576 St. James Avenue.

A vocational department will be installed in the new high school to be erected at Stoughton, Mass., estimated to cost about \$150,000. Bids will be taken until Dec. 31. Charles G. Loring, 7 Water Street, Boston, is architect.

Fire, Dec. 8, destroyed the repair shop at the woolen mill of A. L. Sayles & Sons, used for metal-working, woodworking, etc. It will be rebuilt.

The Charter Oak Machine Co., 438 Asylum Street, Hartford, Conn., has awarded contract to the Austin Co., 217 Broadway, New York, for its one-story plant, 60 x 100 ft., at East Hartford, to manufacture automobile parts.

Fire, Dec. 11, destroyed a portion of the plant of Walter

W. Field & Son, Inc., 51-53 Hayward Street, Cambridge, Mass., operating as general machinists and manufacturers of contractors' equipment, with loss reported at \$18,000.

H. Dick, 140 Main Street, Danbury, Conn., is planning for a one-story machine repair works and automobile service building, 100 x 100 ft., estimated to cost about \$45,000.

Baltimore

BALTIMORE, Dec. 19.

The Continental Service & Garage Corporation, 715 Gaither Building, Baltimore, will soon call for bids for its new automobile plant at Monument and Eutaw streets, to be five stories, 180 x 225 ft., to cost in excess of \$400,000. J. B. Hyatt and George Lamke head the company.

The Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, has acquired property at Nanticoke and Bayard streets, 276 x 479 ft., to be used for power house operations at a later date.

The West Penn Railway & Power Co., Pittsburgh, is reported to be negotiating for the purchase of the municipal power plant at Oakland, Md., through its subsidiary organization, the West Virginia & Maryland Power Co., and for extensions in the existing plant.

The Frederick Motor Co., Frederick, Md., has acquired the property of the Frederick City Garage and will utilize the building in connection with its proposed automobile works on East Patrick Street, to be erected on sites recently purchased, and to be ready for occupancy about April 1. Roy L. Warfield is president.

The Bethlehem Shipbuilding Corporation, Wilmington, Del., operating at the former plant of the Harlan & Hollingsworth Co., will utilize a portion of the plant for steel railroad car production, and has taken a contract for the construction of 30 all-steel passenger cars for the Philadelphia & Reading Railway Co., Philadelphia.

The Treasury Department, Washington, will take bids until Dec. 27 for the installation of an electric light and power plant at the United States Quarantine Station, Baltimore. James A. Wetmore, Washington, is acting supervising architect.

The Florence Silver Plate Co., 108 West Lombard Street, Baltimore, manufacturer of metal products, will build a one-story addition to the factory at 408 Hanover Street, and make improvements in the present building, estimated to cost about \$20,000. It will remove its works to this location about Feb. 1, and dispose of its Lombard Street building.

A vocational department will be installed in the new Eastern High School to be erected by the District of Columbia Commissioners, 427 District Building, Washington, at East Capitol and Seventeenth streets, S. E., to be four stories, 217 x 500 ft., estimated to cost \$950,000.

The City Council, Danville, Va., is planning the erection of an addition to the municipal electric power plant to cost about \$100,000, including steam turbine, boilers and auxiliary operating equipment.

W. N. Drake, Pelham, Ga., is organizing a company to construct and operate a hydroelectric generating plant in the vicinity of Herndon, Ga., estimated to cost about \$200,000, including machinery.

The Richmond Car Works, Richmond, Va., recently organized, has acquired the Government plant at South Richmond, designed for the manufacture of marine boilers but never operated. The new company will remodel the works for the manufacture of steam and electric cars, with fabricating department for the manufacture of architectural and other steel work. A branch will also be devoted to the manufacture of tools and implements. It will operate with a capital of \$500,000, and is headed by Lewis C. Williams, president.

Electric motors, power equipment, ovens and kindred apparatus will be installed in the two-story baking plant, 80 x 90 ft., to be erected by Herman Hecht, 28 Sixth Street, Bristol, Va., estimated to cost about \$75,000. Richard Griesser, 64 West Randolph Street, Chicago, is architect.

The City Council, Augusta, Ga., is considering preliminary plans for a municipal hydroelectric generating plant on the canal, with initial capacity of about 12,000 hp., and estimated to cost \$1,000,000. It is proposed to issue bonds for \$2,500,000 to provide for all features of the project, including a later addition to cost about the same amount.

W. A. Thompson, Cordele, Ga., is organizing a company to establish a plant for the manufacture of electric batteries and other electrical products.

A vocational department will be installed in the new high school to be erected at Leesburg, Va., estimated to cost \$78,000. Plans will be drawn at an early date.

A. M. Kistler, Morganton, N. C., is organizing a company to construct and operate a hydroelectric generating plant in

the vicinity of Lenoir, N. C., estimated to cost close to \$100,000.

Electric pumping machinery will be installed at the municipal waterworks by the Town Council, Frostburg, Md., to replace present steam-operated pumps. Electric service will be furnished by the Hagerstown & Frederick Electric Railway Co.

The Farmville Machinery & Repair Co., Farmville, Va., is planning the establishment of a one-story machine works for which purchases will be made about Jan. 1. The company was organized recently under State laws. Jerome E. Virgie, Crewe, Va., is president.

The Valley Light & Power Co., Woodstock, Va., is planning to immediately rebuild the portion of its power plant destroyed by fire Dec. 11.

Chicago

CHICAGO, Dec. 19.

No action has yet been taken on the Rock Island and Santa Fe lists and other prospective railroad business is not yet beyond the budget stage. Machine-tool sales the past week have been exceedingly light and the largest individual purchase reported was made in Indianapolis, which is outside of the territory served by most local houses. In that city \$20,000 worth of miscellaneous equipment, including several engine lathes, a milling machine, planer, upright drills, etc., was bought for the Arsenal and Technical High School. For a junior high school at South Bend, Ind., figures are now being taken on four engine lathes and other tools. Manufacturers of plumbers' brass goods are fairly busy, and one local seller reports individual sales of three hand screw machines to this class of trade. Another dealer recently sold a turret lathe to a manufacturer of ice machines. The Johns-Manville Co., Madison Avenue and Forty-first Street, New York, is said to have revived a list of machine-tool requirements for its new Waukegan, Ill., plant.

The Cole Storage Battery Co., 2437 Indiana Avenue, Chicago, has let contract for a one-story addition, 40 x 97 ft., to cost \$10,000.

The M. Metzger Co., manufacturer of metal advertising products, 209 South Green Street, Chicago, has purchased the one-story factory, 110 x 175 ft., now being erected by Holton-Seelye & Co., at 3300-38 West Lake Street.

The Dearborn Truck Co., 2515 West Thirty-fifth Street, Chicago, has let contract for a one and two-story addition, 60 x 400 ft., to its plant at Cicero, Ill., to cost \$80,000.

The Nemo Dye Works has let contracts through Paul Gerhardt, architect, 64 West Randolph Street, Chicago, for a one-story plant, 103 x 115 ft., 4203-4209 West Grand Avenue, to cost \$200,000.

J. J. Novy, 2434 South Ridgeway Avenue, Chicago, has prepared plans for a one-story garage and service station, 72 x 125 ft., at Turner Avenue and Twenty-sixth Street, for Charles Fivak to cost \$35,000.

Bids will soon be taken on a one-story pumping station, 65 x 95 ft., and boiler house, 65 x 70 ft., with a 150-ft. water tower, for the Hammond, Ind., waterworks. John Erickson, 30 North La Salle Street, Chicago, is the engineer.

E. J. Bahe, 4734 Magnolia Avenue, Chicago, has let contract for a one-story wood-working factory, 50 x 56 ft., 2342-44 Nelson Street, to cost \$8,000.

The Warren W. Edwards Co., 19 South Wells Street, Chicago, has let a contract for a public garage at 3731-39 Broadway, to cost \$60,000.

Oscar Roen has purchased a site near the Gunderson blacksmith shop, Brodhead, Wis., and expects to erect a machine repair shop in the spring.

R. J. Teator, Muskegon, Mich.; C. T. Mitchell, W. L. Saunders and J. C. Ford, Cadillac, have formed a company which is laying foundations for a malleable foundry at the latter city. It is expected to be completed by July 1 and will produce malleable castings entirely from charcoal iron for automotive, railroad and general uses. Frank D. Chase, Inc., Chicago, is architect and engineer.

The Russell, Burdsall & Ward Bolt & Nut Co., Rock Falls, Ill., has let contract for a one-story addition to cost \$35,000.

The Charter Gas Engine Co., Sterling, Ill., plans to construct a one-story machine shop to cost \$25,000.

The Chicago, Rock Island & Pacific Railroad has let contract for a one-story repair shop at Pratt, Kan., to replace a structure destroyed by fire. It will cost \$100,000.

The Board of Education, Lincoln, Neb., is having plans drawn for a one-story shop, 101 x 170 ft., in connection with a three-story school. The total cost of the school will be \$750,000.

The Leshnick Directory Co., Peoria, Ill., has let contract for a two-story printing shop, 50 x 150 ft., to cost \$100,000.

The Monarch Mining Co., Louisville, Col., is planning to rebuild the tipple at its coal properties, recently destroyed by fire.

The City Council, Corning, Iowa, will call for bids about Jan. 15, for its municipal electric power plant, estimated to cost about \$60,000. C. K. Munn is engineer.

The Electro-Magnetic Tool Co., 2902 Carroll Avenue, Chicago, has acquired property at Cicero, Ill., for \$50,000, heretofore held by G. S. Blakeslee & Co., to be used for a new plant.

A vocational department will be installed in the two-story and basement high school to be erected at Clarinda, Ill., estimated to cost \$200,000. Keffer & Jones, 204 Masonic Temple, Des Moines, Iowa, are architects.

The Henry Artificial Ice Co., Henry, Ill., has preliminary plans under way for a one-story ice-manufacturing plant. B. L. Hulsebus, 1222 Jefferson Building, Peoria, Ill., is architect. C. N. Lucas is president.

The Dennison Garage Co., Mason City, Iowa, has plans under way for a two-story service and repair building, 50 x 130 ft., estimated to cost \$55,000. G. L. Lockhart, 1353 University Avenue, St. Paul, Minn., is architect.

A vocational department will be installed in the two-story and basement high school to be erected at Aledo, Ill., estimated to cost \$150,000. Foundation work is under way. Whitsitt & Schulske, People's Bank Building, Moline, Ill., are architects.

A one-story gravel screening and washing plant, estimated to cost about \$40,000 with machinery, will be constructed by the Kampeska Materials Co., Watertown, S. D.

Cleveland

CLEVELAND, Dec. 19.

The demand for machinery is still confined almost entirely to single tools and indications are that the volume of December orders will not keep up to that of November. Some prospective business will be withheld until January. Dealers are getting a few inquiries, but some are believed to be for inventory purposes. The Seaboard Air Line is inquiring for two turret lathes and other small inquiries have come from railroads which advise that they are getting prices in order to include the machines inquired for in their 1922 budgets. Buyers who are inquiring for used machinery are shopping around considerably and are apparently able to place orders at attractive prices.

Inquiry for locomotive cranes is light and prices still show a downward tendency. Builders have not yet received new specifications for the 34 locomotive cranes for which New York received bids in October, later rejecting all bids.

The Cleveland Wire & Cable Co., recently organized, has established a plant at 1679 Collamer Avenue, East Cleveland, for the manufacture of weather-proof wire and cable. The company was formed largely by concerns interested in the electrical industry in Cleveland. W. H. Starling, of the Peerless Motor Car Co., is president; P. C. Clark, vice-president of the Electric Controller & Mfg. Co., vice-president; W. Hard, Cleveland Light & Power Co., secretary, and E. H. Smith, electrical contractor, treasurer. The directors include J. F. Lincoln, Lincoln Electric Co.; H. L. Martien, Martien Electric Co., and H. C. Gillie, Cleveland Electric Illuminating Co.

The National Razor Mfg. Co., which has been operating a plant in Fremont, Ohio, will move to Lisbon, Ohio, where a new organization has been effected with J. J. Bennet, president; J. J. Hinchliffe, vice-president; T. C. Williams, secretary; W. C. Bellinger, treasurer, and Howard Petty, general manager.

The Sanderson Cyclone Drill Co., Orrville, Ohio, manufacturer of deep well drilling machines, has placed contract for the erection of a new plant, 170 x 320 ft., and office building, 40 x 60 ft.

The Illinois Car Co., Urbana, Ohio, has placed contract for the erection of a new plant and will dismantle its present shops. The new buildings will include an erecting shop, 200 x 300 ft.; wood-working mill, 60 x 160 ft.; blacksmith shop, 60 x 100 ft., and a machine shop, 60 x 80 ft., of steel, concrete and glass construction. With the new plant the company will double its present capacity. The general contract has been placed with the Bellefontaine Bridge & Steel Co., Bellefontaine, Ohio.

The Ladel Mfg. Co., New Philadelphia, Ohio, has begun operations in its new foundry and machine shop which occupies a floor space, 88 x 326 ft. The present buildings will be used for a pattern shop and storage.

The Cleveland Copper Co., Cleveland, has been incorporated to operate the works of the Parish-Pool Co., Cleveland, which went into the hands of a receiver some time ago when its plant was under construction. The new com-

pany will operate under a lease. R. R. Parish, one of the organizers of the old company and its vice-president and general manager, is president of the new company. Copper and brass ingots will be manufactured.

The Rundle Mfg. Co., maker of children's vehicles, including coaster wagons, velocipedes, etc., which has been operating a factory in Columbus, Ohio, has purchased the plant of the Lehr Agricultural Co., Fremont, Ohio, and will move to the latter city shortly. The Rundle company is owned by Fremont men. C. J. Miller is president, and George W. Rundle, treasurer and general manager.

The Vapo Stove Co., Lima, Ohio, has completed a plant for the manufacture of oil stoves which will be equipped with a new type of burner. It was recently organized with a capital stock of \$500,000. Joseph T. Kaufman is president, and Fred Ash, general manager.

The Giant Tire & Rubber Co., Findlay, Ohio, has placed contract for the erection of a factory, 45 x 125 ft.

The Lomar Mfg. Co., which was formed in Texas, will establish a plant in Middletown, Ohio, to manufacture automobile shock absorbers. An Ohio corporation will be formed with a capital stock of \$50,000. C. W. Shartle, Jr., is president and treasurer.

Pittsburgh

PITTSBURGH, Dec. 19.

The only important machine-tool business done here recently was the purchase by the Pittsburgh Railways Co. of one No. 2 Oakley grinder; one 13 x 16-in. Peerless hacksaw and two No. 2 Defiance heavy duty drills. This company also was the buyer of a Fay & Egan planer and joiner and an automatic rip and cut-off Fay & Egan saw, reported last week. New inquiries have been fewer in the past week than recently, probably due to the close of the year. Occasional crane orders are being placed. The past week the Champion Engineering Co., Kenton, Ohio, secured through the Laughlin & Barney Machinery Co., its Pittsburgh district agent, a 5-ton, 32-ft. span overhead crane for installation at the plant of Union Tool Co., Carnegie, Pa. The Kelly & Jones Co., Pittsburgh, which is building a new warehouse in Chicago, has closed for a 5-ton, 56-ft. span crane, with the Pawling & Harnischfeger Co., Milwaukee. Very low prices are said to have been named against pending crane business, it being reported that a price figuring back to about 9c. per lb. has been quoted. This practically puts prices back to the pre-war basis. The inquiry for a 50-ton crane, with 10-ton auxiliary, about which there has been so much mystery, is for the Elliot Co., Jeannette, Pa. This crane is expected to be let this week. The Youngstown Sheet & Tube Co., Youngstown, recently inquired for a 10,000-kw. steam turbo alternator and surface condenser with cooling tower.

The Wilton Tool Co., manufacturer of master gage blocks, measuring and precision tools, will soon move its plant from Detroit to Sharon, Pa., according to an announcement by the Trade and Industrial Bureau, the Chamber of Commerce of Pittsburgh. The company will enlarge its line of products and erect a plant containing about 20,000 sq. ft. of floor area.

E. Stotz, Monongahela Bank Building, Pittsburgh, architect, has plans under way for the proposed technical high school, with vocational department, to be erected at McKeesport, Pa., estimated to cost about \$300,000.

The Bluefield Ice & Cold Storage Co., Bluefield, W. Va., has completed plans for a new ice-manufacturing and cold storage plant, with initial capacity of about 80 tons per day. The storage department will provide for about 2500 tons.

A vocational department will be installed in the two-story and basement high school to be erected by the Board of Education, Burch, W. Va., to be 47 x 120 ft. Bids are being taken until Dec. 31. L. J. Dean, Foster Building, Huntington, W. Va., is architect.

The Pleasant Valley Auto Co., Wheeling, W. Va., will defer the construction of its automobile service and repair works until spring. It is estimated to cost about \$100,000, including equipment. H. R. Markell is president.

Freight handling and conveying machinery will be installed in the five-story warehouse, 130 x 250 ft., to be erected by the Johnstown Terminal Warehouse Co., Johnstown, Pa., estimated to cost about \$450,000. The William Steele & Sons Co., Sixteenth and Arch streets, Philadelphia, are architects.

The United Engineering & Foundry Co., Farmers' Bank Building, Pittsburgh, is planning the erection of a one-story addition on Fifty-fourth Street, 65 x 220 ft.

The Wilkinsburg Ice Co., Centre Street, Wilkinsburg, Pa., will expend about \$125,000 for the erection of its new one-story ice-manufacturing and power plant, 85 x 105 ft., at Turtle Creek, Pa.

The Wilton Tool Co., Detroit, has plans for a new factory at Sharon, Pa., and will break ground at an early date. The present plant will be removed to the new location.

The Seyler Mfg. Co., Undercliff, Pittsburgh, manufacturer of bolts, nuts, etc., has plans under way for the erection of a new one-story factory, 60 x 180 ft.

The Landstreet-Downey Coal Co., Robson-Prichard Building, Huntington, W. Va., recently organized, is planning for the installation of machinery at its properties at Burch, W. Va., including hoisting equipment, undercutting machines, mining locomotive, motors, etc. F. S. Landstreet, Jr., is vice-president, and C. F. Downey, Jr., general manager.

Buffalo

BUFFALO, Dec. 19.

The City Council, Dunkirk, N. Y., has preliminary plans under way for a municipal electric power plant to cost about \$500,000. F. W. Ballard, Swetland Building, Cleveland, is engineer.

The addition to be erected by the Merchants Dispatch Transportation Co., East Rochester, N. Y., will be used for the manufacture of railroad car equipment and considerable car shop machinery will be installed. L. F. West is head.

The American Car & Foundry Co., 165 Broadway, New York, has awarded contract to the Austin Co., Euclid Avenue, Cleveland, for a one-story addition to its plant at Depew, N. Y., 60 x 200 ft., to cost about \$35,000.

John T. Andrews & Son, Pen Yan, N. Y., are considering plans for rebuilding the one-story machine shop at their paper mill, 40 x 80 ft., recently destroyed by fire with loss estimated at close to \$25,000.

The Morley Machinery Co., Rochester, N. Y., manufacturer of planers, special machinery, etc., has acquired the plant of the Defiance Check Writer Corporation, 299 State Street, for extensions. Occupancy will be taken at once.

A vocational department will be installed in the new three-story junior high school to be erected by the Board of Education, Syracuse, N. Y., in the Seventeenth Ward. A. L. Brockway, Third National Bank Building, is architect.

The National Lamp Works will erect a boiler house at 757 East Ferry Street, Buffalo, to cost \$20,000.

The Gulf States

BIRMINGHAM, Dec. 19.

The Humphreys-Pure Oil Co., Mexia, Tex., is considering the erection of a new refinery at Houston, Tex., with initial daily capacity of about 30,000 bbl. It will also build a refinery in the Mexia district. The project is estimated to cost over \$1,000,000. Col. E. A. Humphreys is head.

The Common Council, Wellington, Tex., is planning for a bond issue of \$50,000 for the erection of a municipal electric power plant.

The Consumers' Ice Co., El Paso, Tex., is completing plans for an addition, 35 x 100 ft., estimated to cost about \$50,000.

The Houston Power Co., Dothan, Ala., has commissioned the Southern Engineering Co., Albany, Ga., to prepare plans for a hydroelectric generating plant on the Choctawhatchee River, estimated to cost about \$300,000, including transmission system to connect Newton, Hartford and other points in this part of Alabama.

Fire, Dec. 10, destroyed a portion of the plant of the General Automobile Co., New Orleans, with an estimated loss of \$50,000.

The National Petroleum Co., Hibernia Bank Building, New Orleans, is planning for the construction of a new refinery in the vicinity of Kenner, La. P. A. Leslie is general manager.

The Southern White Cedar Pole Co., Blountsville, Fla., is considering the establishment of a new plant for the manufacture of ice-cream freezers, pails, buckets, etc. C. C. Beattie is general manager.

The Southwestern Power & Light Co., Fort Worth, Tex., a subsidiary of the Fort Worth Power & Light Co., is planning the erection of an addition to increase the capacity from 25,000 to 45,000 kw.

A vocational department will be installed in the John Herbert Phillips High School to be erected at Seventh Avenue and Twenty-fourth Street, Birmingham, estimated to cost about \$1,000,000. D. O. Whilldin, Title Guarantee Building, is architect.

The Mo-Jo Filter Co., Rockdale, Tex., recently organized with a capital of \$50,000, has plans under way for the establishment of a factory to manufacture filtering equipment and parts. R. S. Moore heads the company.

The Common Council, Abbeville, La., will take bids until Jan. 5 for equipment for the municipal electric power plant,

to include oil engines, electric generator, switchboard, exciter, etc. J. Camille Broussard is secretary.

The Chihuahua Electric & Railway Co., Chihuahua, Mex., has been acquired by new interests and plans are under way for extensions in the electric power plants and system. New equipment will be installed. R. Lopez Negrete heads the organization.

A vocational department will be installed in the new high school to be erected at Sulphur Springs, Tex., estimated to cost \$150,000.

Cincinnati

CINCINNATI, Dec. 19.

Contrary to general expectations the machine-tool market the past week showed fair activity. Several manufacturers booked orders exceeding in number those of any week during the past several months and December is expected to be one of the most active months this year. No large orders were booked, however, the majority of sales being one and two machines from widely scattered points. The American Locomotive Co., New York, has closed on its recent list, but no information is available locally as to where the business was placed. The Chesapeake & Ohio and the Delaware, Lackawanna & Western have not taken any action on their recent lists, which is also true of the Rock Island. It is reported that the Pennsylvania Railroad will shortly issue a list of requirements for 1922. Practically all railroad shops in this section have been closed until Jan. 1. This is a customary procedure at this time with most roads, but this year it is being practiced more generally, as appropriations for the year have already been expended and the lack of business has enabled the shops to catch up on repair work of rolling stock.

The Pfau Mfg. Co., Cincinnati, manufacturer of sanitary ware, is putting on the market an issue of \$300,000 worth of gold notes, the proceeds to be devoted to contemplated extensions, and to provide additional working capital to care for expanding business.

Plans are under way whereby the London Motor Plow Co., London, Ohio, tractor manufacturer, will move its plant to Springfield, Ohio. The company is negotiating for space in the Shuey Factories Building and it is expected the installation of machinery will commence about Jan. 1. Fifty men will be employed on production, which will begin Feb. 1. E. H. Daniel is president and general manager.

The U. S. Radiator Corporation will shortly open a storage warehouse in Cincinnati, having leased from the Ferro-Concrete Construction Co. a building which it will erect at McLean Avenue and Exeter Street. It will be two stories, 100 x 114 ft., with direct railroad switching facilities.

The Sterling Mine Supply & Mfg. Co., Cincinnati, was recently incorporated with a capitalization of \$100,000. It manufactures electrical appliances for coal mining with a plant at Cleveland. The head offices are at 1334 Union Trust Building, Cincinnati. L. B. Turnbull, Jr., is president.

The city of Dayton, Ohio, will shortly commence the erection of a new pumping station on Idlewild Avenue. It will be equipped with three pumping units, two having capacities of 1800 gal. per min. and the third, 1400 gal. The estimated cost, including equipment, is \$100,000.

Detroit

DETROIT, Dec. 19.

The United Engine Co., Lansing, Mich., is receiving material for the construction of an addition from the plant of the Aktebolaget Cream Separator Co., St. Louis, recently merged with the United Engine Co. Plans are under way for a new factory in Lansing to manufacture cream separators. Other products formerly made by the Aktebolaget company will also be manufactured.

The Crary-Granzow Machine Co., Benton Harbor, Mich., is considering plans for the construction of an addition or a new plant, to take care of its increasing business.

A dredge manufacturing company is being organized in Homer, Mich., by Walter and Early M. Dryer. More than \$10,000 worth of machinery has been purchased from the Walcott Lathe Co., Jackson, Mich.

The Detroit Marine Aero Engine Co., recently organized, is having plans prepared for a new factory in Highland Park, Mich.

The Northrup Lock Co., Orion, Mich., will start the erection of a new one-story plant in the spring.

The Kaslite Co., Detroit, manufacturer of aluminum utensils, has started construction on a new plant at 3559 Gratiot Avenue. William A. Burns heads the company.



THE RUPTURED SECTION OF THE RUDDER FRAME OF THE FRENCH S. S. CORDILLERE, INDICATED BY THE CROSSED CHALK LINES AND 9 X 5 IN. IN SIZE, WAS WELDED AT SHANGHAI IN 4 HR. BY CHINESE LABOR. WELDING IS BECOMING MORE WIDELY UNDERSTOOD IN THE ORIENT, ACCORDING TO THE EXPORT DEPARTMENT OF THE OXWELD ACETYLENE CO., NEW YORK, THE CHINESE EASILY MASTERING THE MANIPULATION OF THE BLOWPIPE AND SHOWING KEEN INTEREST IN APPROVED PRACTICES AND APPLICATIONS

which was recently organized with a capitalization of \$25,000.

The Fisher Body Corporation, Detroit, will erect a two-story machine shop, 30 x 60 ft., at a cost of approximately \$30,000.

The Motor Wheel Corporation, Lansing, Mich., has awarded contract for its one-story 120 x 240 ft. plant unit.

The Beach Mfg. Co., Charlotte, Mich., is erecting a one-story addition.

The Universal Wrench Co., Ltd., Windsor, Ont., has been organized with \$250,000 capital to do a general machine and foundry business. The incorporators are D. C. Munro, W. C. Fillmore and others.

The Citizens Light & Power Co., Adrian, Mich., is planning the installation of a 2000-kw. turbo-generator and condenser, to be ready for operation next summer.

The Stearns Lighting & Power Co., Ludington, Mich., expects to have its new \$225,000 power plant completed Feb. 1.

The Buick Motor Car Co., Flint, Mich., has taken out a permit for the erection of an addition to No. 1 plant, at a cost of \$97,000.

The Belding Gas & Oil Co., Belding, Mich., is planning the erection of new storage tanks to care for increased business.

The State Board of Correction, Lansing, Mich., is considering plans for the construction of a new industrial school estimated to cost close to \$2,500,000, including equipment.

The Simons Sales Co., 436 West Willis Avenue, Detroit, has taken bids for a one-story automobile service and repair building, 50 x 175 ft., estimated to cost about \$85,000. Albert Kahn, 1000 Marquette Building, is architect.

A vocational department will be installed in the new three-story high school to be erected at Highland Park, Mich., estimated to cost \$125,000. W. S. Holmes, Tussing Building, Lansing, Mich., is architect.

The Rieber-Kolz Mfg. Co., Adrian, Mich., manufacturer of automobile lighting equipment, has secured property at Blissfield, Mich., and plans for the early removal of its works.

Milwaukee

MILWAUKEE, Dec. 19.

Beyond an occasional order for one or two tools, manufacturers expect but few sales in the next two weeks. The trade, however, will enter the new year with more substantial support of an expectancy of good business than it did a year ago. Inquiry has been moderately active since the latter part of November, and while only a small quantity of business is passing it appears certain that some fair-sized orders will be placed soon after the first of the year. Milling machine makers sold more tools the first half of December than the last half of November, but other classes of equipment ran about even. A great deal of confidence is

held in the prospect of good buying by railroads and railroad equipment shops early in the new year, and inquiry from these sources is increasing steadily. Automotive industries have been only quiet buyers recently and a resumption of demand is looked for hopefully.

The Western Malleable Co., Beaver Dam, Wis., has let contracts for a power plant addition to be equipped for pulverizing coal to meet the requirements of a change in its fuel system. The work also embraces laying pipe lines for distribution of fuel to the three plants operated by the company in Beaver Dam, and other mechanical changes in boilers, furnaces and ovens. The Elm Street plant resumed production Dec. 15, re-employing 250 men on a large order for railroad castings which will require several weeks to execute. H. L. Kirsh is general manager.

The Ackerman Oil Co., 301 Majestic Building, Milwaukee, which recently acquired a three-acre site in Cudahy, has plans for a small refinery, warehouse and distribution group and office building, estimated to cost about \$50,000. Bids will be taken Dec. 23. David Ackerman is president and general manager.

The Cataract Mfg. Co., Milwaukee, incorporated recently with \$50,000 capital stock to manufacture pumps and other mechanical appliances, has purchased equipment and opened a machine shop at 262-264 Fifth Street. The corporate style has been changed to the Lueck Mfg. Co. Frank R. Lueck is president and general manager.

The Board of Education, Kaukauna, Wis., will proceed with its plans for erecting a new junior high and vocational training school. Parkinson & Dockendorff, architects, La Crosse, Wis., are designing a brick, tile and steel building, two stories and basement, T-shaped, 100 x 185 and 60 x 62 ft., estimated to cost about \$175,000. Bids will be taken in January. T. A. Towsley is secretary of the board.

The Alliance Investment Co., 115 Wisconsin Street, Milwaukee, has let the general contract to the W. W. Oeflein Co., 86 Michigan Street, for a brick, steel and concrete public garage and service building, 60 x 120 ft., two stories and part basement. It will cost about \$60,000 complete. M. Tullgren & Sons are the architects.

The Otto Pietsch Dye Works, 254 West Water Street, Milwaukee, is taking bids through the Birkholz Engineering Co., 216 West Water Street, for the boilers, motors and other equipment of the power plant for its new plant under construction at Third Street and Atkinson Avenue. The power house will be 40 x 60 ft., and the main plant, 100 x 120 ft.

The Stoughton Wagon Co., Stoughton, Wis., has decided to remodel the manure spreader department of its works into a motor truck factory to provide facilities lost through the burning of the truck shop early in November with a loss of \$250,000. This will be a temporary measure, for the company expects to start work in the spring on a fireproof building for the motor truck division. F. J. Vea is president.

The Fort Howard Paper Co., Green Bay, Wis., advises *THE IRON AGE* that the report published in the issue of Dec. 1 that it has let a contract for the construction of a new paper mill is incorrect. The general contract, the company advises has not yet been let to anyone.

Indiana

INDIANAPOLIS, Dec. 19.

The J. A. Huetter Machine Co., 545 Kentucky Avenue, Indianapolis, is completing plans for a one-story machine shop at 537 Kentucky Avenue, 55 x 85 ft., estimated to cost about \$25,000.

The Indiana Refining Co., Lawrenceville, Ind., is planning the construction of a pipe line from Lawrenceville to Owensboro, Ky., estimated to cost approximately \$1,000,000.

The Southern Indiana Power Co., Williams, Ind., has plans under way for a new electric power plant, estimated to cost \$75,000. Holland, Ackerman & Holland, 106 Liberty Avenue, Ann Arbor, Mich., are architects.

A vocational department will be installed in the two-story and basement high school to be erected at Butler, Ind., 55 x 125 ft., estimated to cost \$100,000. Bids are being taken until Dec. 28. A. H. Elwood & Son, 201 Haynes Building, Elkhart, Ind., are architects.

Mayer & Mayer, 443 Scioto Street, Indianapolis, have plans in preparation for a one-story machine shop, 50 x 120 ft., on Ellsworth Street, estimated to cost \$25,000.

Plans are being prepared for the construction of a one-story power house at the Indiana State Normal School, Terre Haute, Ind. Shourds & Stoner, 511 Tribune Building, are architects.

Electric motors and other power equipment will be installed in the five-story printing plant, 100 x 135 ft., to be erected by C. E. Pauley 112 East Maryland Street, Indianapolis, estimated to cost \$200,000.

The J. C. McFarland Co., 3551 Parnell Street, Chicago,

manufacturer of art metal doors, metal windows, etc., has preliminary plans under way for a one-story addition to its branch plant at Laporte, Ind., 100 x 200 ft., to cost close to \$75,000.

Seattle

SEATTLE, Dec. 13.

The Todd Dry Docks, Inc., Seattle, Wash., has plans under way for the construction of a new dry dock, with shop facilities, at its Harbor Island yards.

The Coy Valve Co., Chehalis, Wash., recently organized with a capital of \$1,000,000 to manufacture valves and other steam specialties, is negotiating for a site for its new plant, estimated to cost \$150,000. George Graham heads the company.

The Northwestern Power & Mfg. Co., Port Angeles, Wash., is considering preliminary plans for a new hydroelectric generating works on the Lyre River, Clallam County, estimated to cost about \$400,000. Headquarters are in the New York Building, Seattle.

The Prouty Lumber & Box Co., Warrenton, Ore., has acquired a local site and plans the erection of an electrically-operated box factory and sawmill. The latter will be equipped for a daily capacity of about 125,000 ft. of lumber.

The Menasha Woodenware Co., North Bend, Ore., has plans under way for the first unit of a new works, estimated to cost \$50,000. A. J. Lustif, Lewis Building, Portland, Ore., is engineer. Herbert Armstrong is local manager.

The Mack Motor Truck Co., Seattle, Wash., has concluded arrangements for leasing a new building to be erected at Roy Street and Ninth Avenue, at an estimated cost of \$100,000. It will be used for local headquarters and operations. Henry Bittman, Seattle, is architect.

The Central South

ST. LOUIS, Dec. 19.

The Haynes-Langenberg Mfg. Co., 4045 Forest Park Boulevard, St. Louis, manufacturer of steam, hot-water and other furnaces and heaters, etc., has awarded contract to Charles B. McCormack & Sons, Columbia Building, for rebuilding the portion of its plant recently destroyed by fire. The work is estimated to cost about \$125,000.

The Chicago, Rock Island & Pacific Railroad Co., 139 West Van Buren Street, Chicago, will commence the immediate rebuilding of its car repair shops at Pratt, Kan., recently destroyed by fire, estimated to cost about \$100,000.

The Independent Glass Co., Chattanooga, Tenn., will commence the immediate erection of a new two-story plant, 50 x 190 ft., to manufacture automobile windshields and kindred products. A. R. Williams is president.

The Cumberland & Manchester Railroad Co., Barbourville, Ky., will make enlargements in its car shops at Heldrick, Ky., including improvements in present works and equipment, to cost about \$250,000. F. M. Heldrick is president.

The Elkfield Coal Co., Garth, Ky., recently organized is planning for the installation of equipment at its local properties, to include electrical apparatus, locomotive, coal cars, mining tools, rails, etc. J. G. Bowman is president, and R. Q. Young, manager.

Electric motors and other equipment will be installed in the addition to be erected by the Standard Printing Co., 218 First Street, Lexington, Ky., estimated to cost about \$95,000. D. B. Rose is president.

The Consumers Ice & Cold Storage Co., Eldorado, Ark., recently organized, with a capital of \$100,000, is planning the erection of a new ice-manufacturing factory with initial capacity of about 60 tons per day. E. L. Pye is president, and H. M. Johnson, secretary and treasurer.

A vocational department will be installed in the new one-story and basement high school, 118 x 160 ft., to be erected at Mt. Pleasant, Tenn., estimated to cost \$75,000. George Waller, Independent Life Building, Nashville, Tenn., is architect. Bids will be asked at an early date.

Mercer Reynolds, Chattanooga, Tenn., is perfecting plans for the organization of a company to establish a plant at Nashville, Tenn., for the manufacture of bond papers and other paper products. A site for the mill has been selected. It is estimated to cost in excess of \$75,000 with machinery.

The Seymour Packing Co., Topeka, Kan., is having plans drawn for a new five-story cold storage plant, 50 x 150 ft., estimated to cost about \$100,000. The Tait-Nordmeyer Engineering Co., St. Louis, is engineer.

The Oklahoma Burner Co., Tulsa, Okla., manufacturer of gas burners and gas-burning equipment, is considering plans for a new plant with increased capacity. D. Ruark is secretary.

A vocational department will be installed in the proposed three-story and basement junior high school to be erected at Joplin, Mo., estimated to cost about \$400,000.

The White Co., 2443 Lindell Avenue, St. Louis, is completing plans for the erection of a one-story automobile service and repair building, estimated to cost about \$75,000. Preston J. Bradshaw, International Life Building, is architect.

A. B. Banks, Little Rock, Ark., and associates, are developing plans for works at White Cliffs, Ark., recently acquired to manufacture fertilizers, etc. A company with capital of \$1,000,000 will be organized, and the proposed plant, it is said, will cost in excess of \$250,000, including machinery.

The Kentucky Block Coal Co., Hazard, Ky., is considering rebuilding its machine shop and other departments, recently partially destroyed by fire, with loss estimated at close to \$50,000.

The Liberty Electrical & Mfg. Co., 95 North Third Street, Memphis, Tenn., has filed plans for a one-story factory, 50 x 150 ft.

Canada

TORONTO, Dec. 19.

Dealers report very limited activity in the machine-tool market the past week. Inquiries are in good volume, however, the majority of which are expected to turn into sales, and as a consequence a strong feeling of optimism prevails with regard to early 1922 business. The automobile industry is again preparing for active operations and as it has been buying equipment only in a limited way, considerable business is looked for in the future. Municipal governing bodies are preparing to go ahead with new construction work and are having plans prepared for electric plants, waterworks and sewage systems for which equipment will be required. Railroads have been ordering rails more freely of late and in addition several good-sized contracts have been let for car repair work. On the whole dealers consider the outlook for the coming year is brighter than it has been since the close of the war. The demand for small tools is quiet, with users buying only what they require for immediate use.

The Continental Electric Co., 505 King Street East, Toronto, recently incorporated to manufacture auction cleaners, etc., has commenced operations. It is the intention of the company to extend the operating capacity in the early future by installing additional machinery.

The Dominion Steel Corporation, Sydney, N. S., has specifications ready for a large machine shop, to be erected in Sydney. The company has in view the centralization of all machine work and repairs for its railroads, colliers and steel plants. It is stated that construction will start in the near future.

The American Optical Co., Nicolet, Que., will build a glass factory to cost \$75,000.

The Hamilton Tar & Ammonia Co., Caroline Street North, Hamilton, Ont., will build a factory and warehouse to cost \$50,000 at Ottawa, Ont. W. M. Currie, president of the company, will receive bids for tar stills and all equipment, including tanks, etc.

The Mid-Western Tractor Wheel Co., Ltd., Amherstburg, Ont., recently formed with a capital stock of \$1,000,000, is establishing works for the manufacture of tractor wheels, with a daily capacity of 150 sets. The plant will be 200 x 400 ft., one-story, of steel and concrete, and is expected to be completed and in operation by July 1. The officers include E. Edmiston, president; T. H. Fox, first vice-president; Charles A. Cuddy, second vice-president; J. G. Prince, treasurer; A. E. Carpenter, secretary. Glen J. Walker, who has had many years' experience in motor factories, will be production manager and chief mechanical engineer. H. H. Lane is a director.

The Alliance Brass Co., Ltd., recently formed with a capital stock of \$75,000, has rented a building on Hunter Street East, Peterborough, Ont., and is installing machinery and preparing to go into the manufacture of valves and other brass goods.

Construction has been started on the erection of a plant at Peterborough, Ont., for the Red Arrow Tires, Ltd., recently incorporated with a capital stock of \$2,000,000. The factory, which is under construction, will be 205 x 90 x 60 ft., two stories and basement, and will have a capacity of 500 tires and 500 tubes per day. The plant will be rushed to completion and is expected to be in operation by April next. The officers are J. J. Turner, president; G. A. Gillespie, vice-president; J. R. McDonald, secretary; P. P. Westby, treasurer. Joseph Rath, of Durant Motors, Buffalo, N. Y., is a director.

The Birmingham Motors, Ltd., has leased a building on Monaghan Road, Peterborough, Ont., with an option to pur-

chase, where it proposes to install machinery and carry on manufacturing operations. Jamestown, N. Y., interests are behind the new enterprise.

The Frontenac Floor & Wall Tile Co., Kingston, Ont., is building a grinding plant for feldspar for the manufacture of floor and wall tile.

The general contract for the construction of car cleaning shops costing \$50,000 for the Canadian Pacific Railway, at Glen yards, has been awarded to D. G. Loomis & Son, 211 McGill Street, Montreal.

The I. T. S. Rubber Co., 26 Alpine Avenue, Toronto, Ont., will build an addition to its tire plant to cost about \$60,000. W. Jeffries is superintendent.

The F. B. Coombs Furniture Co., Kincardine, Ont., is in the market for additional wood-working machinery.

The Acton Canning Co., Acton, Ont., is in the market for grinding equipment, vats, etc., to replace that recently destroyed by fire.

California

SAN FRANCISCO, Dec. 13.

The Doble Motors Corporation, Call Building, San Francisco, Cal., manufacturer of steam-driven automobiles, is negotiating with the Chamber of Commerce, San Mateo, Cal., with view to building a new plant in the Burlingame section, estimated to cost \$300,000, including machinery. G. H. Landfield is representing the company.

The Brown-Bevis Co., Inc., Los Angeles, machinery merchant and manufacturer of rebuilt machinery has acquired the property of the Madsen Iron Works, 2416 East Sixteenth Street, comprising about 30,000 sq. ft. of land and buildings totaling 20,000 sq. ft.; the purchase includes a 150-ft. and 24-ft. traveling crane. The new owner will take possession in January, when the Madsen company will remove to its new plant at Huntington Park.

A. B. Atkinson, 3526 Fifth Avenue, Sacramento, Cal., is having plans prepared and will soon take bids for the erection of a one-story ice-manufacturing plant, 80 x 160 ft., at Thirteenth and S streets, estimated to cost about \$75,000. F. A. S. Foale, Sacramento, is architect.

The County Board of Supervisors, Oakland, Cal., will call for bids early in January, for a one-story power plant; one-story ice and refrigerating plant; shops and other buildings at the County Infirmary grounds. H. H. Meyers, Kohl Building, San Francisco, is architect.

The State Department, Sacramento, Cal., will soon call for bids for a six-story warehouse at San Francisco, 122 x 812 ft., and estimated to cost close to \$2,000,000, with equipment. Frank G. White, Ferry Building, San Francisco, is architect in charge.

A vocational department will be installed in the two-story high school to be erected by the Board of Education, Tustin, Cal., 80 x 220 ft., and estimated to cost \$135,000. Mott M. Marston, 535 I. W. Hellman Building, Los Angeles, is architect.

The Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, is contemplating the erection of a new electric generating plant on the Pit River, Shasta County, estimated to cost \$100,000.

The M. & M. Mfg. Co., Wilmington, Los Angeles, recently organized with a capital of \$200,000 to manufacture machinery and parts, and now operating a local factory, is planning the erection of permanent works on Mormon Island, Los Angeles Harbor. D. G. McGregor is president, and B. L. Morgan, general manager.

The Sacramento Brick Co., Sacramento, Cal., is planning for the installation of new machinery to develop an annual capacity of about 30,000,000 brick. Equipment will also be installed for the manufacture of roofing tile. H. H. Bartells is general manager.

Delmore Motors Corporation, 58 West Thirty-ninth Street, New York City, will go into the production of the parcelmobile. The passenger end of the business will be gradually developed. The parcelmobile is designed to carry light freight and packages up to 500 lb. The company is now completing arrangements for the manufacture of the first 100 parcelmobiles.

The International Harvester Co., Hamilton, Ont., has resumed operations in its malleable iron foundry, giving employment to 35 men. It is also expected that the gray iron foundry will re-open in about a month's time.

The Kalamazoo Steel Products Co., manufacturer of steel chairs and stools for office and factory purposes, has resumed operations with 20 men employed.

IRON AND INDUSTRIAL STOCKS

Conflicting Conditions Make for Narrower and Irregular Price Changes

On the one hand, we have had a slowing up in general business since November, with prospects of further curtailment after the turn of the year in many lines of industry. On the other hand, we have a continually improving money situation, with a strong likelihood that conditions existing before the war will return in 1922. As a result of such conflicting economic conditions we have a tendency on the part of the investor to go slower in purchases of iron and industrial stocks, especially now that the available supply of high yielding shares and bonds has narrowed down to a relatively small amount. In addition, holders of railroad shares, in a large number of cases, have been uneasy over the prospects of trouble arising from further reductions in wages and the unwillingness of the carriers to lower freight rates. Their feeling is that the case of the railroads, in the event of labor troubles, would not have the public sympathy. Speculative interest aroused by the initial announcements of proposed mergers of steel properties has lagged recently, and unless there is a turn for the better in the stockyard strike situation, some investors fear unfavorable developments in allied industries. All of which explains in a large measure some of the recent selling of stocks. The movement of security values naturally has been narrower and attended by more or less irregularity.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	37% - 39%	Lackawanna Steel.	45% - 47%
Allis-Chalm. pf..	88 - 90	Midvale Steel.....	28 - 29%
Am. Can com....	32% - 35%	Nat.-Acme	11% - 12
Am. Can pf.....	94% - 97	Nat. E. & S. com.	37% - 41%
Am. C. & F. com.	145 - 148%	N. Y. Air Brake.	60 - 61
Am. Loco. com....	97% - 101	Nova Scotia Steel.	23% - 23%
Am. Loco. pf....	111 - 115	Press. Steel com..	65% - 68%
Am. Radiator com.	88% - 89%	Press. Steel pf....	92% - 93
Am. Steel F. com.	33% - 34%	Ry. Stl. Spg. com.	91 - 94
Am. Steel F. pf..	95 - 95%	Ry. Stl. Spg. pf....	- 106%
Bald. Loco. com..	94% - 98%	Replodge Steel....	26% - 30
Bald. Loco. pf....	- 104	Republic com....	52% - 54%
Beth. Steel com..	52% - 55	Republic pf....	84 - 86%
Beth. Stl. Cl. B..	57 - 59%	Sloss com.....	37% - 39
Beth. Stl. 8% pf..	105% - 106%	Sloss pf.....	- 74%
Chic. Pneu. Tool..	55 - 62%	Transue-Williams.	31% - 32%
Colorado Fuel....	25 - 26%	U. S. Pipe com...	17% - 17%
Cruc. Steel com..	64% - 69%	U. S. Pipe pf....	51% - 52%
Cruc. Steel pf....	87 - 89%	U. S. Steel com..	83% - 85
General Electric.	140 - 143	U. S. Steel pf....	112% - 113%
Gt. No. Ore Cert..	31% - 32	Vanadium Steel..	31% - 32%
Gulf States Steel.	47 - 49	Westingh'se Elec.	49% - 51%
Int. Har. com....	82 - 85%		

Industrial Finances

The American Seeding Machine Co., Springfield, Ohio, has declared quarterly dividends of 1 1/4 per cent on the common and 1 1/2 per cent on the preferred stock, payable Jan. 15 to stock of record Dec. 31.

A reorganization of the Walden-Worcester, Inc., Worcester, Mass., wrenches, has been completed. J. Verner Crittley is president and will act as agent for the receivers until discharged by the court. Warren S. Bellows and Lewis E. Bellows retain a financial interest and active management. The reorganized company has a capital of 2500 shares common stock, no par value; \$300,000 first preferred stock and \$250,000 second preferred stock.

The Gorman-Brown Engineering Corporation, Boston, has incorporated under Massachusetts laws with Ernest N. Brown, 163 Dorchester Street, Boston, as president; John R. Honors, 57 Monument Avenue, Swampscott, vice-president; and William F. Forman, 163 Dorchester Street, Boston, treasurer. The capital consists of 500 shares of no par value, all of which are issued.

Edmund S. Wolf, Bridgeport, Conn., has been appointed temporary receiver for the Coe-Stapley Mfg. Co., West Haven, Conn., automobile and bicycle pumps and sheet metal goods. The company was incorporated in 1918 and is capitalized for \$950,000. R. E. Carpenter, Boston, is president and Robert R. Adams, Bridgeport, treasurer.

Directors of the Youngstown Sheet & Tube Co., Youngstown, Ohio, have declared a dividend of 50c. per share on the 800,000 shares of non-par value common stock outstanding and \$1.75 on the preferred, both payable Jan. 2 to holders of record Dec. 20. The dividends represent payment for the fourth quarter of 1921. The company paid dividends on common at the rate of \$1.50 per share on Jan. 1, 1921, \$1 on April 1 and 50c. on July 1 and Oct. 1 each.

Directors of the Newton Steel Co., Youngstown, Ohio, have authorized the regular quarterly preferred dividend of \$1.75 per share, payable Jan. 2 to stock of record Dec. 20. It has \$705,000 of preferred outstanding. Though the com-

pany has never paid a dividend on common stock, a sizable surplus against that issue has been accumulated.

Industrial issues at Youngstown, Ohio, stimulated for a time by current merger reports, have registered recessions within the past two weeks. Common stock of the Youngstown Sheet & Tube Co., most frequently mentioned in connection with consolidation gossip, has declined from a recent high of \$70 to \$65. Trumbull Steel common is now listed at \$21, as compared with a recent listing at \$23, while the junior issue of the Brier Hill Steel Co. is quoted at \$20.75, as compared with a recent listing at \$23.50. Sheet & Tube preferred is quoted at \$104, Brier Hill preferred at \$100 and Trumbull preferred at \$96. Last sale of common stock of the Newton Steel Co. was negotiated at \$75, and of Falcon Steel Co. at \$80. United Engineering & Foundry Co. common is listed at \$158 bid and \$160 asked.

The Dalton Adding Machine Co., Cincinnati, is issuing \$750,000 worth of 8 per cent sinking fund 10-year convertible gold notes. The proceeds from the issue will be used to place on the market several new types of calculating machines which the company recently has perfected. It is not contemplated, at the present time, to make any extensions to the plant.

Directors of the Brier Hill Steel Co., Youngstown, Ohio, have declared the regular quarterly preferred dividend of \$1.75 per share, payable Jan. 2 to holders of record Dec. 20. The company has omitted the common dividend for several quarters.

The O. K. Giant Battery Corporation, Gary, Ind., has been placed in the hands of a receiver. The total assets are given at \$125,000 and are exceeded by the total indebtedness.

Representatives of 40 per cent of the outstanding stock of the American Brass Co. have formulated and approved a plan by which there will be offered to all the stockholders of the American Brass Co. the opportunity to dispose of their shares to the Anaconda Copper Mining Co. for \$150 in cash and three shares of Anaconda stock against each share of American Brass Co. stock.

The petition of creditors of the John Obenberger Forge Co., Milwaukee, bankrupt, for permission to reorganize the corporation as the United States Forge Co., has been denied by John F. Harper, referee in bankruptcy. The liabilities of the Obenberger company were scheduled at approximately \$890,000 and assets of \$1,250,000 were claimed.

The W. W. Sly Mfg. Co., Cleveland, maker of foundry equipment, has increased its capital stock from \$35,000 to \$175,000.

A temporary organization of a Cleveland section of the Industrial Cost Association, which aims to standardize cost finding methods, was effected Dec. 7. Robert E. Belt, secretary and treasurer American Malleable Castings Association, Cleveland, was selected as temporary chairman and L. J. Flynn, auditor Van Dorn & Dutton Co., was chosen temporary secretary and treasurer. A membership campaign will be conducted and another meeting will be held Jan. 19, when a permanent organization will be effected.

The National Acme Co., Cleveland, has sold \$5,000,000 7½ per cent first mortgage 10-year bonds to bankers, who in turn have sold the issue to investors.

The report of the Laconia Car Co., Laconia, N. H., discloses net earnings before federal taxes amounting to \$133,945, contrasted with \$146,877 for the previous year, ending Sept. 30, 1920. At the close of the year there was a surplus of \$120,550, as against \$131,975 at the close of the previous year.

The net profits before inventory adjustment and Government tax, as reported by the Canadian Car & Foundry Co. for the year ended Sept. 30, last, were \$107,603, equivalent to \$1.43 a share on the corporation's \$7,500,000 preferred stock. The profits for the previous year were \$529,337, or \$7.19 a share on the same amount of stock. The profit and loss surplus, after providing for inventory shrinkage, taxes, etc., and after deducting preferred scrip dividends, amounted to \$3,251,207, contrasted with \$6,243,603 for the preceding year.

S. W. Platt, for several years Pittsburgh district manager for a number of large scrap iron and steel firms, has gone into business for himself under the firm name of S. W. Platt & Co., with offices at 604 First National Bank Building, Pittsburgh.

The Cal Hirsch & Sons Mercantile Co., St. Louis, is now in its new offices in rooms 1101-1129, Central National Bank Building.

The Illinois Copper & Iron Mfg. Co. has changed its address to 1830 West Grand Avenue, Chicago.

BOOK REVIEWS

United States Steel: A Corporation with a Soul. By Arundel Cotter. Pages 312, 5½ x 8 in., illustrated. Published by Doubleday, Page & Co., Garden City, N. Y.

Mr. Cotter's book, "Authentic History of the United States Steel Corporation," was published January, 1916. Glancing through the new volume, which has a slightly different title, brings one to a keen realization of how much has happened in the past six years. Two truly great events affected the Steel Corporation; the decision in the dissolution case and the Great War, while the steel strike of 1919 was an event of no small importance.

As was said in THE IRON AGE of Feb. 17, 1916, when Mr. Cotter's original book was reviewed, there can be no question about his friendly attitude toward the Steel Corporation, and this is shown in his summary of the dissolution suit, which necessarily is rather brief. There is ample reason for issuing the new volume, which will be an addition to the library of anyone who wishes to be informed in regard to industrial history. A number of chapters are rewritten and others are added. Nothing of first importance seems to have missed the author's attention and he has made a valuable contribution to the list of books on business topics.

The story of how the Steel Corporation helped to win the war bristles with facts and figures, but is lacking in some features which would have made it more interesting. The account of the dissolution suit and of numerous investigations of the steel industry, is necessarily very much curtailed. The history of the Steel Corporation in recent years shows it has fully lived up to the principles so rigidly insisted upon by Judge Gary, especially as to co-operation with the independent companies and his opposition to unreasonable demands of labor unions. Mr. Cotter's discussion of "Questions of Policy" will be perused with much interest as will also the chapter on "United States Steel from an Investor's Viewpoint."

New Trade Publications

Steam Condensation Tables.—Wheeler Condenser & Engineering Co., Carteret, N. J. 1921 edition of a booklet entitled, "Steam Tables for Condenser Work." This is the sixth edition of a work which for many years has been widely used by engineers dealing with the condensation or evaporation of steam. The tables are in handy book form, pocket size. The properties of saturated steam are tabulated from 29.8-in. vacuum to atmospheric pressure in increments of tenths of an inch referred to a 30-in. barometer. The values were especially calculated for this book by Prof. Marks. As it is customary in vacuum work to read vacuum in inches of mercury, this is said to be superior to the old method of giving absolute pressures in lb. per sq. in. Above atmospheric pressure the increments are in pounds gage. The book explains how measurements are made by means of the mercury column and barometer, and gives constants and tables for making corrections. Corrections for the thermal expansion of mercury, for the relative expansion of mercury and brass scale, and other corrections are included.

Factory Flooring.—Carter Bloxonend Flooring Co., 1303 Long Building, Kansas City, Mo. Booklet P, 20 pp. 3½ x 6¼, with the title "Bloxonend Flooring." Describing Bloxonend Flooring, its uses, its adaptability to concrete, wood or steel construction and its advantages over loose wood blocks. It goes into some detail regarding the various methods of installing Bloxonend and contains a partial list of installations.

Effective Jan. 1, the Acme Fancy Wire Works, Detroit, will be known as the Acme Wire & Iron Works. This change is made so that the name may give some indication of the company's output. Some years ago, when the concern was started, it manufactured fancy iron designs, but since the business has expanded so that wire and iron and metal products generally are manufactured. No changes will be made in personnel. The company has a thoroughly modern plant at 3527 East Canfield Avenue, Detroit, and is enjoying the largest business in its history.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	Per Lb.
Refined bars, base price	2.68c.
Swedish bars, base price	10.00c.
Soft steel bars, base price	2.68c.
Hoops, base price	3.53c.
Bands, base price	3.28c.
Beams and channels, angles and tees 3 in. x 1/4 in. and larger, base	2.78c.
Channels, angles and tees under 3 in. x 1/4 in., base	2.68c.

Merchant Steel

Merchant Steel	Per Lb.
Tire, 1 1/2 x 1/2 in. and larger	2.65c.
(Smooth finish, 1 to 2 1/2 x 1/4 in. and larger)	2.85c.
Toe calk, 1/2 x 3/8 in. and larger	3.25c.
Cold-rolled strip, soft and quarter hard	.625c. to 7.25c.
Open-hearth spring steel	3.75c. to 6c.
Shafting and Screw Stock:	
Rounds	3.88c.
Squares, flats and hex.	4.38c.
Standard cast steel, base price	12.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

1/4 in. and heavier	2.78c.
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Sheets

Blue Annealed

Blue Annealed	Per Lb.
No. 10	3.28c. to 3.53c.
No. 12	3.33c. to 3.58c.
No. 14	3.38c. to 3.63c.
No. 16	3.48c. to 3.73c.

Box Annealed—Black

Box Annealed—Black	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20		3.80c.
Nos. 22 and 24	3.85c.	4.10c.
No. 26	3.90c.	4.15c.
No. 28	4.00c.	4.25c.
No. 30	4.25c.	
No. 28 and lighter, 36 in. wide, 10c. higher.		

Galvanized

Galvanized	Per Lb.
No. 14	3.95c. to 4.10c.
No. 16	4.10c. to 4.25c.
Nos. 18 and 20	4.25c. to 4.40c.
Nos. 22 and 24	4.40c. to 4.55c.
No. 26	4.55c. to 4.70c.
No. 27	4.70c. to 4.85c.
No. 28	4.85c. to 5.00c.
No. 30	5.35c. to 5.50c.
No. 28 and lighter, 36 in. wide, 20c. higher.	

Welded Pipe

Standard Steel	Black	Galv.	Wrought Iron	Black	Galv.
5/8 in. Butt...	—56	—40	5/8-in. But...	—30	—13
5/8 in. Butt...	—61	—47	1 1/2-in. Butt...	—32	—15
1-3 in. Butt..	—63	—49	2-in. Lap...	—27	—10
3 1/2-6 in. Lap.	—60	—46	2 1/2-6-in. Lap.	—30	—15
7-8 in. Lap...	—56	—34	7-12-in. Lap...	—23	—7
9-12 in. Lap...	—55	—33			

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.00c.
Annealed soft	4.00c.
Galvanized annealed	4.75c.
Coppered basic	4.50c.
Tinned soft Bessemer	6.00c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17 1/4c. to 17 3/4c.
High brass wire	17 1/4c. to 17 3/4c.
Brass rod	14 3/4c. to 15 c.
Brass tube, brazed	26 c. to 27 1/2c.
Brass tube, seamless	18 1/2c. to 19 c.
Copper tube, seamless	21 1/4c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21 1/2c. per lb. base.
Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin	Grade "AAA"	Grade "A"	Coke—14-20	Primes Wasters
Charcoal	Charcoal	14x20	80 lb....	\$6.05 \$5.80
			90 lb....	6.15 5.90
			100 lb....	6.25 6.00
IC...\$10.00	\$8.50		IC... 6.40	6.15
IX... 11.25	10.00		IX... 7.40	7.15
IXX... 13.00	11.50		IXX... 8.40	8.15
IXXX... 14.75	13.25		IXXX... 9.40	9.15
IXXXX... 16.25	15.00		IXXXX... 10.40	10.15

Terne Plates

8-lb. Coating 14 x 20	
100 lb.	\$7.00
IC	7.25
IX	7.50
Fire door stock	10.00

Tin

Straits, pig	35c.
Bar	40c. to 45c.

Copper

Lake ingot	16 c.
Electrolytic	15 3/4c.
Casting	15 1/4c.

Spelter and Sheet Zinc

Western spelter	6 1/2c. to 7c.
Sheet zinc, No. 9 base, casks	10 1/2c. open 11c.

Lead and Solder*

American pig lead	5 3/4c. to 6 1/4c.
Bar lead	6 1/4c. to 7 c.
Solder, 1/2 and 1/2 guaranteed	27c.
No. 1 solder	25c.
Refined solder	21c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	80c.
Commercial grade, per lb.	40c.
Grade D, per lb.	35c.

Antimony

Asiatic	6 1/2c. to 6 3/4c.
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Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	29c. to 31c.
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Old Metals

Business has taken on the usual holiday dullness. Values continue firm. Dealers' buying prices are nominally as follows:

Cents Per Lb.
Copper, heavy crucible.....
Copper, heavy wire.....
Copper, light and bottoms.....
Brass, heavy.....
Brass, light.....
Heavy machine composition.....
No. 1 yellow brass turnings.....
No. 1 red brass or composition turnings.....
Lead, heavy.....
Lead, tea.....
Zinc.....

